

modern machine shop

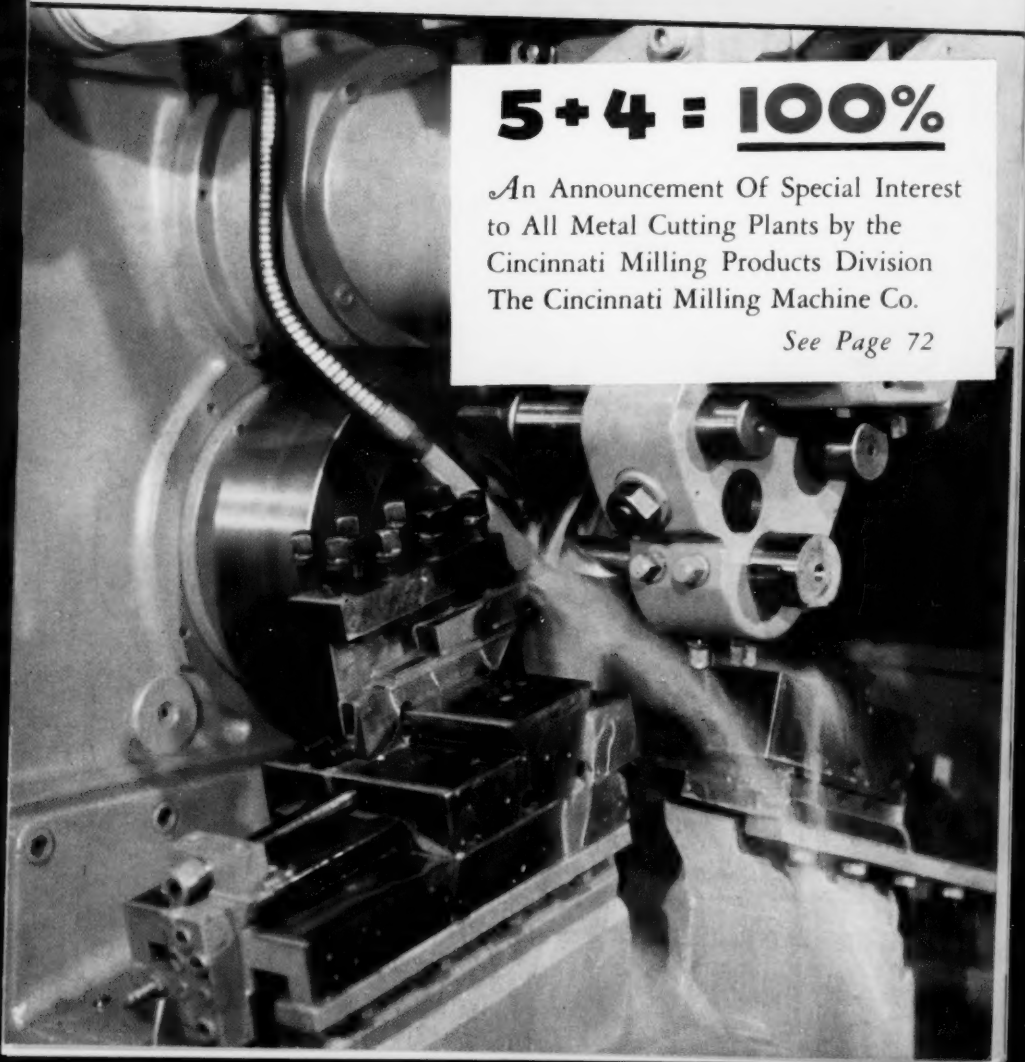
**PROGRESS
DEMANDS
CHANGES**

See Page 100

**FEATURES
IN BRIEF**

See Page 102

MARCH 1955



5 + 4 = 100%

*An Announcement Of Special Interest
to All Metal Cutting Plants by the
Cincinnati Milling Products Division
The Cincinnati Milling Machine Co.*

See Page 72



Endurance Insurance for your tools

Your tools need insurance, too!... the kind that Adamas Carbide gives:

Premium performance
... work-proved Adamas Carbide grades, job-engineered to fit both YOUR special and standard applications.

Coverage against costly down-time ... there's no faster delivery in the industry than Adamas'.

It costs you no more to get this **protection** ... maximum tool-life, minimum production costs.

Write, wire or phone for your ADAMAS CARBIDE catalog today ... and get the "best tips" in the industry.

ADAMAS

TUNGSTEN CARBIDE ®

ADAMAS CARBIDE CORP. • KENILWORTH, NEW JERSEY

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March 1955 Issue

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**modern
machine
shop**

**431 Main Street
Cincinnati 2, Ohio**

Circle key numbers for more information on items described or advertised in this issue.

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shop**

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modern machine shop

MARCH

1955

Vol. 27

No. 210

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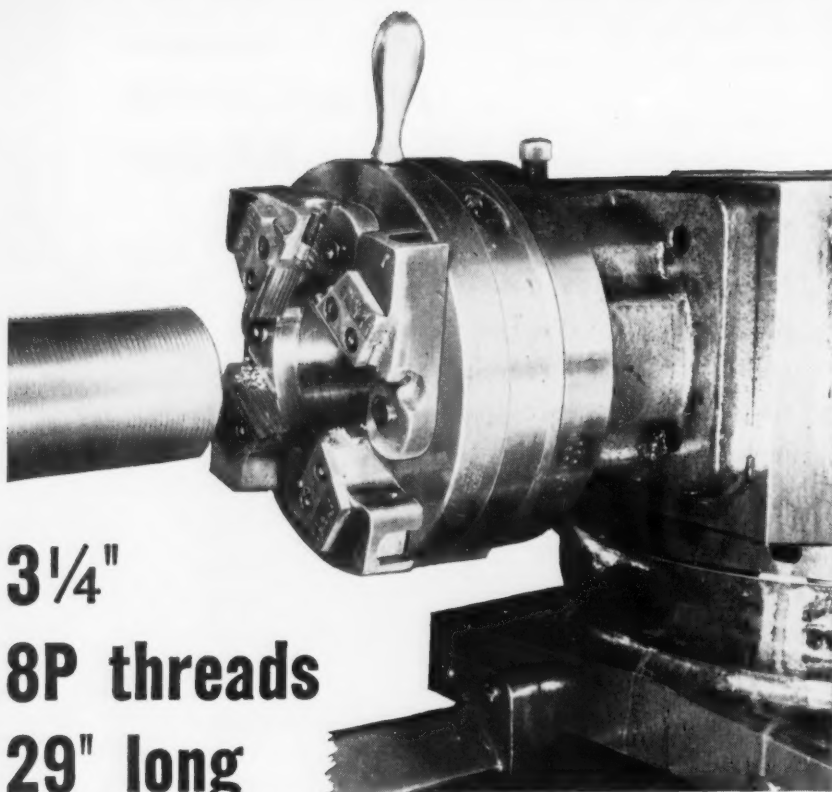
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Member



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(For more information on cover advertisements, use Reader Service Cards)



3 1/4"

8P threads

29" long

with LANDMATIC 32AX Head

The bars of 4150 steel, heat-treated to 28-32 Rockwell C, are threaded to Class 3 fit at the Reed Prentice Corp., Worcester, Mass. Tangential chasers allow threading after heat-treating with long tool life. Special centering throats eliminate the out-of-round condition common in long workpieces.

The 32AX LANDMATIC is a stationary self-opening head for cutting 8 pitch or finer threads on diameters up to 4" to any practical length. With oversize chaser holders, short threads can be cut up to 6 1/4" in diameter. A larger head, the 40AX, will thread diameters up to 9 1/4". Ask for Bulletin F-90.

LANDIS *Machine* COMPANY

WAYNESBORO • PENNSYLVANIA • U. S. A.

For more data circle 201 on Reader Service Card

Hammond of KALAMAZOO FOR DEBURRING



Model
50-DD

It is amazing how soon these Abrasive Belt Machines pay for themselves.

11 combinations available with or without Duskolector.

Hammond Machinery Builders INC.

1615 DOUGLAS AVENUE

KALAMAZOO, MICHIGAN

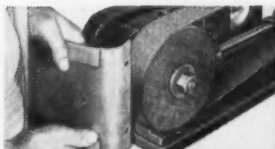
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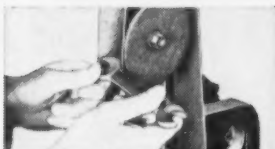
IRREGULAR SHAPES



FLAT WORK



CONTACT WHEEL



CONTOURED PARTS



HARD-TO-GET AREAS

"Clip" this ad
to your letterhead.
20 page catalog will
be sent at once.

SPECIAL INTRODUCTORY UNIT

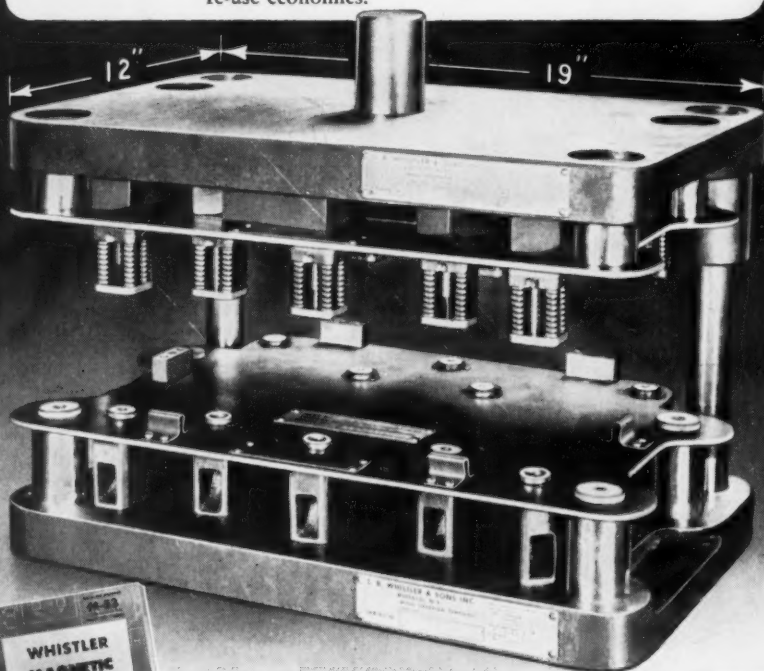
WHISTLER 10 HOLE MAGNETIC PERFORATING DIE

**Cut die costs
drastically,
start
production
quicker**

This M-12-14 Complete Introductory Unit includes a set of blank templates, ten punches, dies, strippers and punch and die retainers complete to make up a 10 hole precision perforating die. Any diameters from $\frac{1}{8}$ " to $\frac{1}{2}$ " to your selection. Catalog illustrates additional re-use economies.

\$675

NET F. O. B. OUR
PLANT



SEND FOR CATALOG Illustration shows how quick and simple it is to set up a Whistler Magnetic Perforating Die ready for production. Larger standard units can be added to suit your requirements.

S. B. WHISTLER & SONS, INC.

*Manufacturers of Adjustable, Magnetic and Custom
Built Dies for All Industry*

**WHISTLER DIES ARE
CUTTING COSTS FROM
COAST TO COAST**

740 Military Road

Buffalo 23, New York

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You can make all these gears on one machine

These are only some of the wide variety of precision gears and parts that you can make on a Farrel-Sykes "Twin-Head" generator.

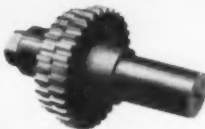
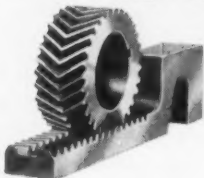
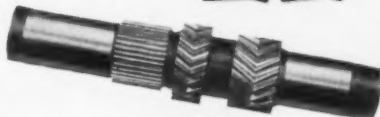
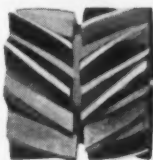
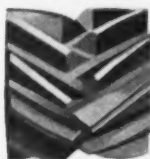
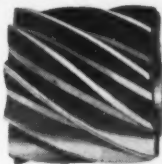
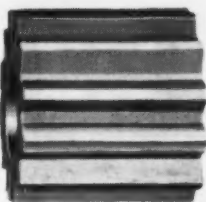
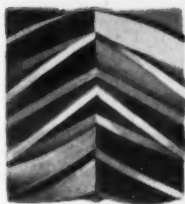
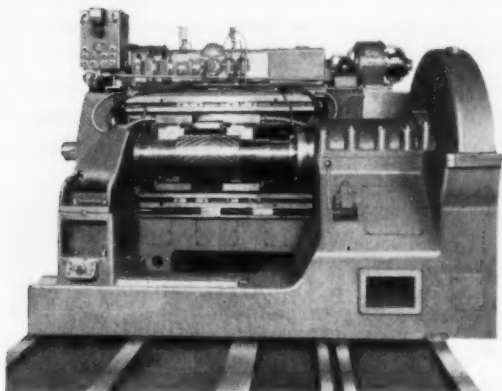
Costs will drop as the unequalled speed, accuracy and convenience of this machine keeps production flowing fast. Setups and change-overs are effected so rapidly that down-time is held to a minimum. Operators prefer the machine for its ease of operation, such as rapid selection of speeds and feeds, simple adjustment of cutters, and positive control of infeed.

Write now for details of this versatile gear generator. You will find it profitable in your shop.

FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.

Sales Offices: Ansonia, Buffalo, New York,
Cambridge (Mass.), Akron, Cleveland,
Chicago, Los Angeles, Houston



FB-939

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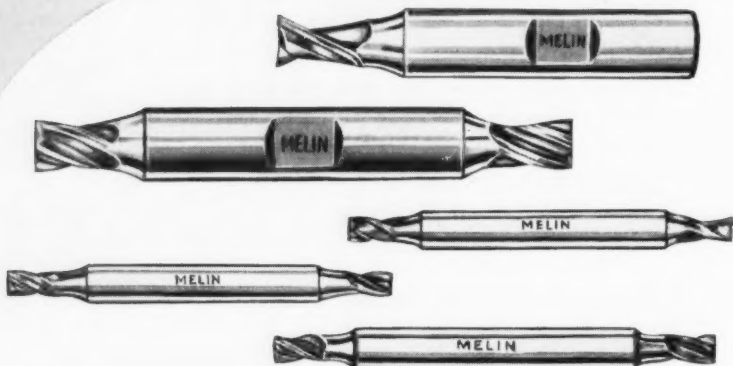
MELIN

STUB LENGTH END MILLS

with flutes shorter than regular

Offer **GREATER STRENGTH...**★

TWO, THREE AND FOUR FLUTE



...★ *Plus an Exclusive* ... In addition to manufacturing a complete line of End Mills, the Melin Tool Company makes several standard *Stub Length Mills* exclusive of other tool manufacturers. The new Melin Tool Catalog No. 54-C lists the specifications on these *all inclusive Stub Length Tools* ... and ... they offer greater strength and less breakage. Write for your catalog ... today.

Representatives in Principal Cities

**MELIN TOOL
COMPANY, INC.**

3373 West 140th Street
Cleveland 11, Ohio



For more data circle 205 on Reader Service Card

do you have

OIL SEAL TROUBLES?



SUPERFINISH **can solve them!**

Here's a typical case where a shaft with ground surfaces was driven at a speed of 1750 r.p.m. The oil seals created enough heat to burn the shaft and stop the motor. To make matters worse, it was found that twice the original speed was necessary. So, the oil seal surfaces were *Superfinished*, and the shaft operated at a speed of 3500 r.p.m. With the *Superfinished* surfaces, no heat was developed at this higher speed. No further trouble was encountered.

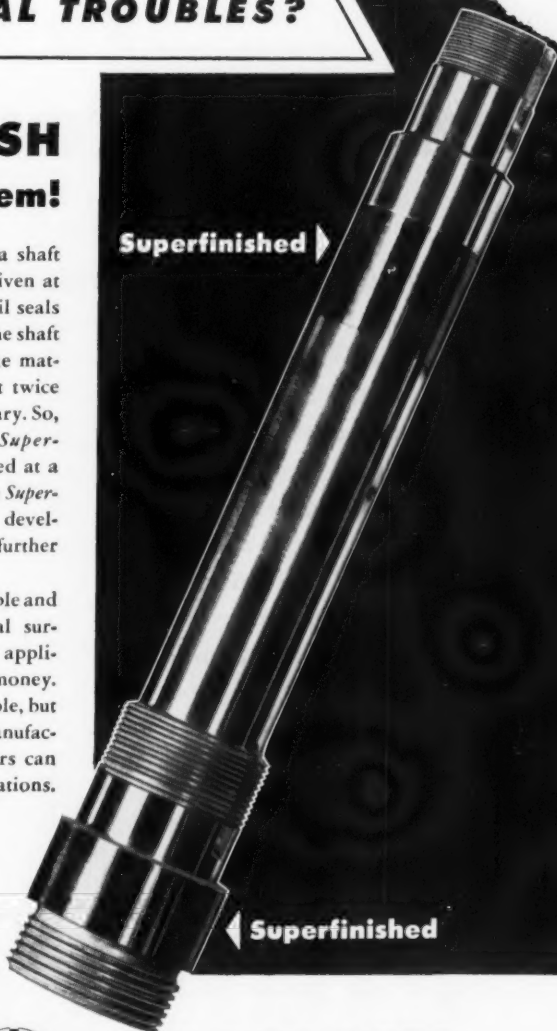
Superfinishing is a quick, simple and inexpensive process. Oil seal surfaces are but one of the many applications where it can save you money. Not only can it eliminate trouble, but often it can help you reduce manufacturing costs. Gisholt engineers can advise you regarding its applications.

Write now for the booklet
"Wear and Surface Finish."

THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.



Superfinished ▶



◀ **Superfinished**

GISHOLT

MACHINE COMPANY

Madison 10, Wisconsin

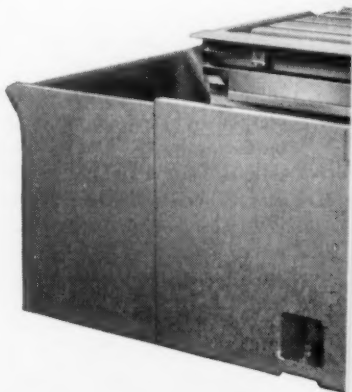
TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

Destined to make an outstanding

NEW HyPowermatic

New CINCINNATI HYPOWMATICS are the world's finest heavy duty automatic milling machines . . . they are worthy of the immediate attention of your replacement committee. ¶ These new machines are built in 42 sizes, plain and duplex styles, 36" to 168" table traverse, up to 50 hp drive. Outstanding time and effort saving features include Dynapoise overarm, Hydramech table drive, backlash eliminator, automatic spindle stop. More details in catalog No. M-1871. Write for your copy today.

**THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO**

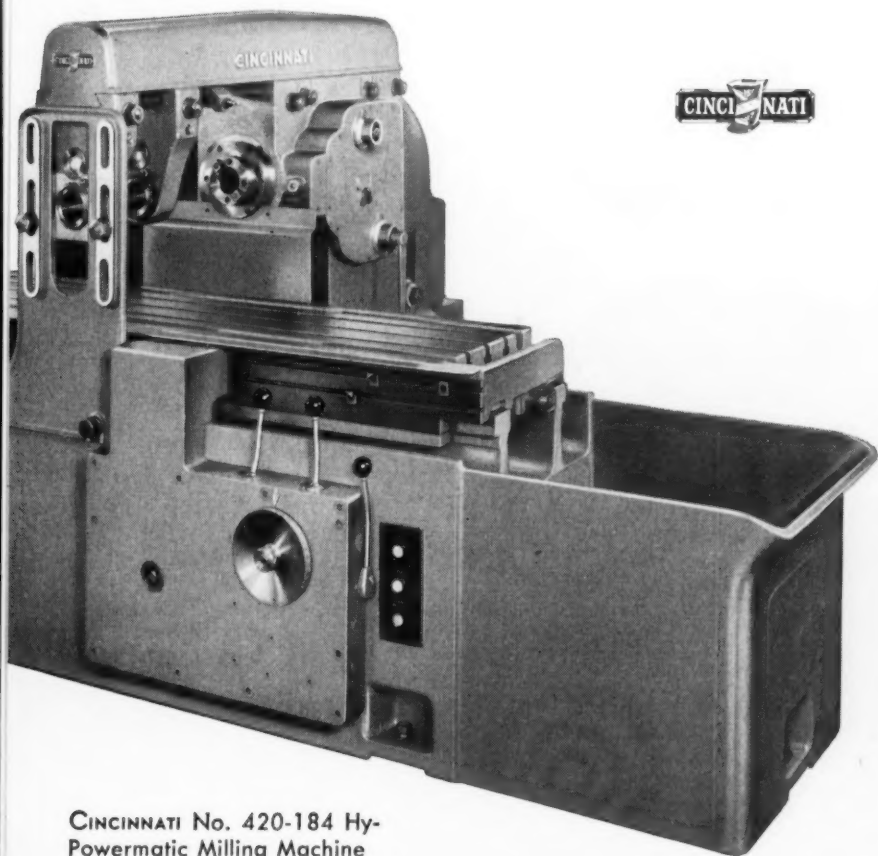


CINCINNATI

MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING MACHINES • FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLI

record in reducing costs

CINCINNATI MILLING MACHINES



CINCINNATI No. 420-184 Hy-Powermatic Milling Machine with Automatic Quill Retraction.

For more data circle 208 on Reader Service Card

March, 1955

MODERN MACHINE SHOP 9



milling, drilling, tapping machine yields

For more data circle **210** on Reader Service Card

Can you afford to ignore an investment that returns 100% in less than a year? It doesn't seem likely, yet many plant operators hold down milling, drilling, and tapping operations to the capacity of standard machines.

In contrast, the owner of this Avey production machine made high returns on this cast iron pump body (it may be similar to yours): 1 operator instead of 6; floor space cut from 600 to 180 sq. ft.; time per part from 5 minutes to 42 seconds. Put these figures in profit-and-loss terms and you see why the Avey machine pays off so fast.

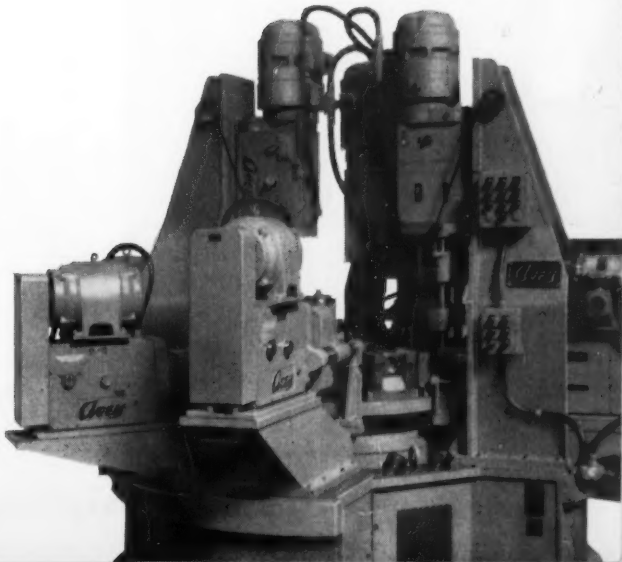
► *This machine has now been re-engineered for a different part—so economically that even higher gains are expected this year.*

Whatever your cash situation, new tax laws and Avey's pay-as-you-produce plan enable you to make this fast-earning investment now. Send a print of your part, state desired production rate, and ask Avey for a profit prediction. ◀

THE AVEY DRILLING MACHINE CO.,
CINCINNATI 1, OHIO

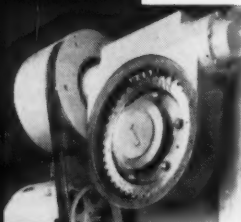
drilling, tapping, production machines

93.4% the first 9 months



Columbia

power squaring
shear features



long-life gear train

These Columbia gear train features all combine to assure long life, minimum maintenance.

- Special alloys
- Bearings designed for this particular application
- Gears in operation only during cutting cycle
- Provision to reposition the worm wheel for even distribution of wear

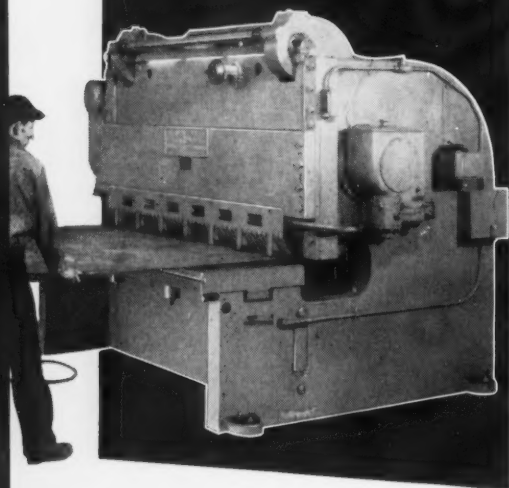
THIS COLUMBIA GEAR TRAIN ASSURES

.....a

SMOOTHER CUT

.....a

LONGER LIFE



Write for new FREE Bulletin No. PS-4
and the name of your distributor.

From more than 100 years of experience in building heavy metalworking equipment, Columbia engineers have evolved a gear train of exceptional life and capacity.

The worm shaft is of heat-treated alloy steel, supported by extra heavy duty anti-friction bearings. A specially cut high tensile alloy bronze worm gear, keyed to the eccentric shaft, provides smooth power to the shear ram. Since the bronze worm gear teeth are under load for only 180 degrees of each cutting cycle, periodic repositioning of the worm wheel evenly distributes the wear, greatly increasing gear train life . . . and the gear train is inoperative except during the actual cutting cycle.

You get more service . . . better service . . . from Columbia Shears.

Columbia Power Squaring Shear
Model OBO6, 1/2" x 6'

COLUMBIA
DIVISION

THE

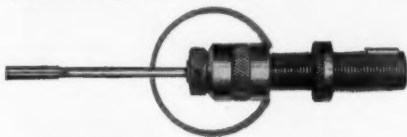
Lodge & Shipley Co., Hamilton 11, Ohio

**SCULLY
JONES**

"Precision Holding" Tools solve difficult drilling, tapping and reaming problems...reduce costs!

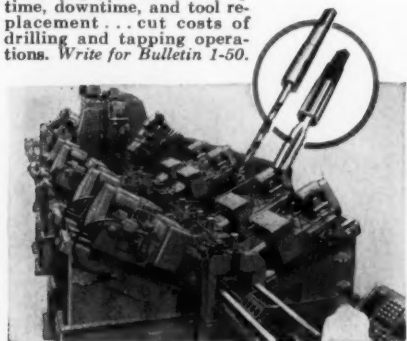
Newest Floating Holder simplifies tool changes, assures free float

Here's how Greenlee Bros. & Co. uses the Scully-Jones new "JT" Lock and Eject Collet Type Floating Holder on multiple-spindle transfer units. With the double-gear spline-drive principle, these floating holders compensate for any misalignment between tools and work... easily maintain close tolerances... reduce downtime and damage to cutting tools... speed and simplify tool changes... reduce maintenance troubles and costs. With true freedom of float, they eliminate "dead spots" and cramping—conditions that may be affecting tool life and quality of work on your drilling, reaming, and tapping jobs! Write for Bulletin 8-50.



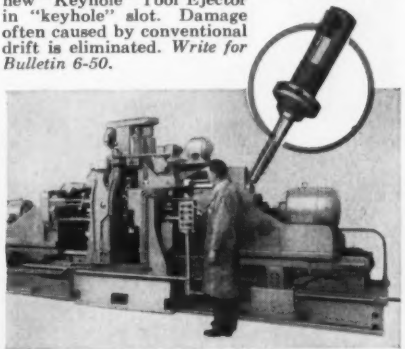
Drill and Tap Chucks cut production costs on Greenlee transfer unit

Greenlee engineers put Scully-Jones Drill and Tap Chucks on this 16-station transfer unit to provide a positive, accurate drive for the cutting tools. Carefully hardened and ground, they resist nicking, give long life under heavy stresses or loads, and run concentric. They help you save on setup time, downtime, and tool replacement... cut costs of drilling and tapping operations. Write for Bulletin 1-50.



Adjustable Adapters speed tool changes and adjustments

Scully-Jones Quick-Lock Adjustable Adapters help this BARNESDRIL 10-station double-end trunnion machine operate at near capacity. The "pilot nose" makes it easy to insert the adapters... minimizing setup and downtime for tool changes. Quick-Lock Nut provides quick, accurate adjustments for tool depth at each spindle or in a tool presetting program. Cutting tools are quickly removed by using Scully-Jones new "Keyhole" Tool Ejector in "keyhole" slot. Damage often caused by conventional drift is eliminated. Write for Bulletin 6-50.



SCULLY-JONES AND COMPANY, 1909 S. ROCKWELL ST., CHICAGO 8, ILL.

SCULLY-JONES

"Precision Holding" for holding precision

Call your Scully-Jones representative or distributor—factory-trained "Precision Tool and Work Holding Specialist"—for complete information and service.

For more data circle 212 on Reader Service Card





big news in tooling plate is DOW MAGNESIUM!

It's light in weight, the price is low,
machinability is unsurpassed . . . magnesium
opens a new door to low cost tooling for you

Dow's new magnesium tooling plate is now available from Dow distributors across the country. This is the lightest tooling plate ever made—a full third lighter than aluminum and one-fourth the weight of steel. Yet you'll find its price lower than other commonly used tooling materials.

Dow magnesium tooling plate is rolled—not cast—providing larger sizes, freedom from porosity, better toughness, and a smooth mill surface. Thermal flattening assures positive

dimensional stability and excellent flatness. Easiest of all metals to machine, magnesium permits speed and economy unequalled by other metals.

Extra rigidity, good weldability and high strength-to-weight ratio, too, make magnesium plate ideal for jig, fixture and tooling uses. Call your Dow magnesium distributor, today, for price and delivery data or write THE DOW CHEMICAL COMPANY, Midland, Michigan.

DISTRIBUTORS: FULLERTON STEEL AND WIRE COMPANY, Chicago, Ill. • HUBBELL METALS INC., St. Louis, Mo. • A. R. PURDY CO., INC., Lyndhurst, N. J. • RELIANCE STEEL COMPANY, Los Angeles, Cal.

Visit the Dow Booth, No. 809, at A.S.T.E. Convention March 14-18 in Los Angeles

you can depend on DOW MAGNESIUM



For more data circle 214 on Reader Service Card

A Mechanical Eye to Watch Your Tools



U.S. Pat. No. 2,679,038
Other Patents Pending

Reduce Tool Costs!

*Cross Tool Control Unit
Automatically Stops
Machine When Tools
Need Changing*



The Cross Tool Control Unit reduces tool costs, decreases machine downtime. Available in four different sizes, it can be used with most types of metalworking equipment.

Here's what it does:

- ★ Provides continuous picture of used and unused tool life and establishes performance standards.
- ★ Decreases downtime by permitting tool changing in groups.
- ★ Reduces scrap by stopping machine before tools lose size.
- ★ Reduces tool grinding costs.

Write for complete details today.

Established 1898

THE **CROSS** CO.
DETROIT 7, MICHIGAN
Special MACHINE TOOLS

For more data circle 215 on Reader Service Card

SANFORD BENCH SURFACE GRINDER MODEL SG

for Wet* or Dry Grinding!

PRECISION • SPEED • SENSITIVITY

A low cost, precision machine for surface grinding dies, instrument parts, gauges and other small parts which would fit in the palm of the hand.

By using Sanford Bench Grinders many manufacturers of precision machinery have drastically cut over-all costs for finishing small intricate parts. This releases large, more expensive machines for heavier duty work.

The Sanford SG is the only low cost Bench Surface Grinder that

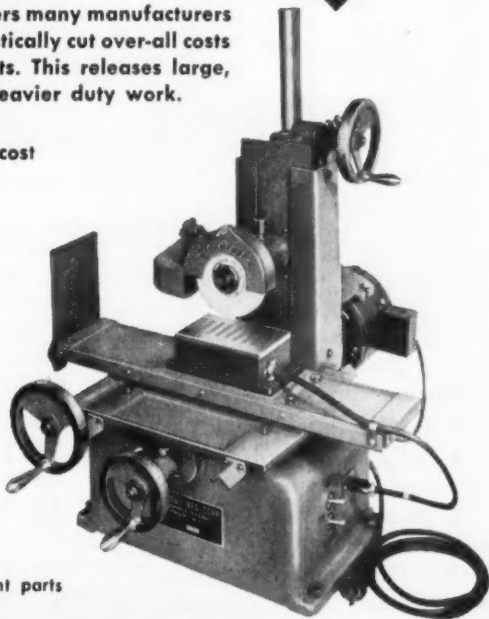
- Grinds to less than .0001" tolerances
- Operates without vibration
- Assures long life because Meehanite castings are used in its construction

SPECIFICATIONS—4" traverse
—8" longitudinal—6" vertical
under 4" wheel. Approximate
weight 160 lbs.

Complete details are included
in illustrated bulletin.

Send for your copy today.

Reconditioning facilities, replacement parts
and special attachments are available.
Send for price list.

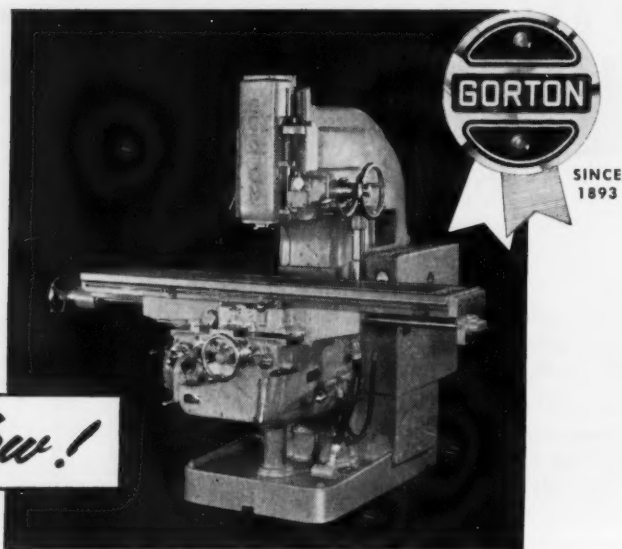


*With optional equipment

SANFORD MANUFACTURING CORP.
1022 Commerce Ave., Union, N. J.

For more data circle 216 on Reader Service Card

GORTON PRESENTS A *Winner!*

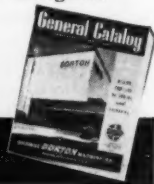


NEW GORTON 3-48 VERTICAL MILL

Check Your Requirements and These Features

1. 76" table with 48" table travel.
2. Extended saddle with hardened inserts.
3. Fullwidth knee with 24½" bearing spread.
4. Square lock bearing guides.
5. 10 H. P. Spindle motor — drives spindle only.
6. 36 spindle speeds from 25 to 2,000 R. P. M.
7. 3 H.P. motor for table, saddle and knee.
8. Mechanical and electrical overload protection.
9. Interchangeable Assembly Unit Construction.
10. Removable coolant pan for easy clean-out.
11. Dial-type Horse Power load meter.
12. Spindle drive gear designed to reduce wear.

Write for Complete Catalog 1655-1703.



GEORGE **GORTON** MACHINE CO.

1703 RACINE STREET • RACINE, WISCONSIN

SINCE 1893

Tracer-Controlled Pantographs, Duplicators — standard and special... Horizontal and Vertical Mills, Swiss-Type Screw Machines, Tool Grinders, Small Tools and Accessories.

For more data circle 217 on Reader Service Card

A8196-1P-A

THEY SAID: "IMPOSSIBLE"

**This special Lempco Press
made the job routine!**

This special Shell Forging Press, designed and built by Lempco made a routine job of a shell forging operation that was thought "impossible" to produce on any press.

Because of the high speed of ram travel — 840 inches per minute — that Lempco built into this big 400 ton press, production is up to 80 shells per minute on an assembly line basis.

In building presses for special applications, Lempco refuses to label any job "impossible". Lempco engineers call on a background of 35 years experience to reduce your problems to routine by customizing presses — big or small — that perform with satisfaction for every job requirement.

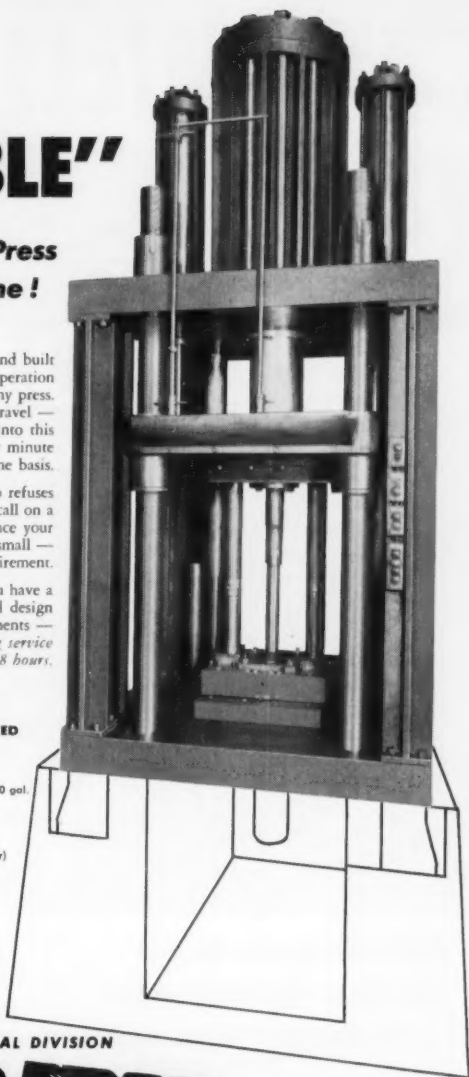
Why not put this experience to work when you have a pressing problem that requires specialized design and engineering! Just let Lempco know your requirements — they'll take over from there. *Lempco engineering service endeavors to answer all inquiries within 48 hours.*

THESE IMPRESSIVE OPERATING STATISTICS MATCH THE IMPRESSIVE SIZE OF THIS CUSTOMIZED SHELL FORGING PRESS

- Capacity — 400 tons
- Height — 32 ft. (16' above foundation)
- Width — 64'
- Depth — 94'
- Cylinder — 20" dia. — 2500 p.s.i.
- Max. Pressing Speed — 840 inches per minute (with Accumulator)
- Max. Pressing Speed — 160 inches per minute (with Pump only)
- Stroke — 42"
- Reservoir Capacity — 2200 gal.
- Accumulator — 600 gal.
- Pump — 220 g.p.m.
- Motor — 400 h.p.



FRANK VASARMELY
Chief Tool Engineer
Designer of Press



INDUSTRIAL DIVISION

BEDFORD

LEMPCO

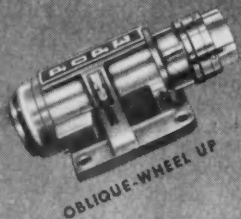
OHIO, U. S. A.

For 35 Years — a Leading Builder of Machine Tools

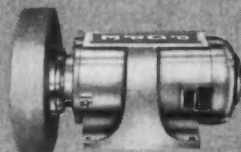
For more data circle 218 on Reader Service Card

**WANT TO
GRIND IN**

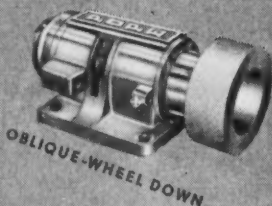
MILLIONTHS?



OBLIQUE-WHEEL UP



HORIZONTAL



OBLIQUE-WHEEL DOWN

Specify
POPE

**2500 SERIES
HEAVY DUTY
MOTORIZED
SPINDLES**

For
**Surface Grinders,
Planers, Boring
Mills and other
Machine Tools**



Diamond Wheel
VERTICAL-WHEEL UP



Diamond Wheel
VERTICAL-WHEEL DOWN

**for MORE PRODUCTION
BETTER SURFACE FINISHES
TOLERANCES IN THE MILLIONTHS**

use these P-2500 Series Spindles.
They have the extra power,
bearing capacity and rigidity to
do the job.

Write for new Catalog No. 58A

POPE

TRADE MARK REG. U.S. PAT. OFF.

POPE MACHINERY CORPORATION

ESTABLISHED 1920

261 RIVER STREET • HAVERHILL, MASSACHUSETTS
BUILDERS OF PRECISION SPINDLES

No. 93

For more data circle 219 on Reader Service Card



**IN THE
AIRCRAFT INDUSTRY, IT'S**

UNION



**UNION DISTRIBUTORS
SERVE THE NATION**

FOR • SPEED
• ECONOMY
• RELIABILITY
• PERSONAL CONTACT
CALL YOUR UNION DISTRIBUTOR

UNION TWIST DRILL COMPANY • ATHOL, MASSACHUSETTS

OWNERS AND OPERATORS OF: S. W. CARD MANUFACTURING CO. DIVISION, Mansfield, Mass.
BUTTERFIELD DIVISION, Derby Line, Vermont and Rock Island, Quebec



THIS ONE WAS EASY . . .

A Nilson 4-Slide, Number 1, forms 150 drapery hooks per minute from 0.70 basic steel wire. Nilson 4-Slides form wire or ribbon stock from the coil. They straighten, feed, pierce, blank, swage, stamp or coin, cut and form in one, fast, automatic operation . . . accommodate wire up to .5" dia., in feeds to 32" max., and ribbon up to 3.5" wide. Press sections from 5 to 75 tons. Send for catalog.

NILSON 4-SLIDE TAKES A TOUGH ONE

Mass production of body trim clips for a leading make automobile proved a complex forming problem. A. H. Nilson's 4-Slide (Model S-4-T) did the job, forming .025" x 3", 1065 C.R.A. steel at 54 strokes per minute! Accurate, fast, and automatic, Nilson 4-Slides keep pace with one of the nation's biggest industries.



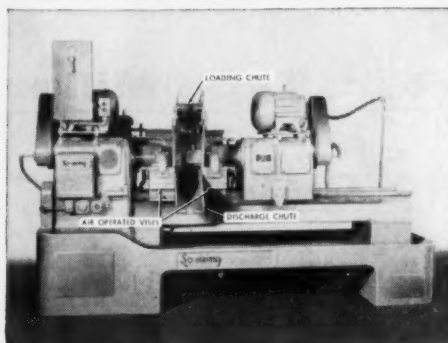
1514 RAILROAD AVENUE, BRIDGEPORT 5, CONN.

Automatic Chain Making Machines : Staple Forming Machines : Wire and Stock Reels : Wire Straightening Equipment : Slide Feeds for Presses

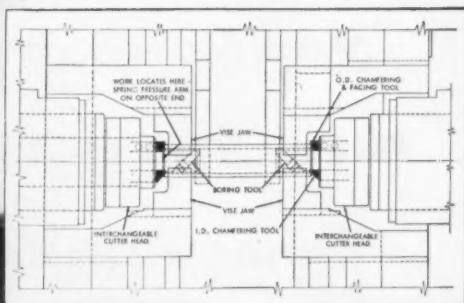
For more data circle 221 on Reader Service Card

MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK



TOOLING LAYOUT



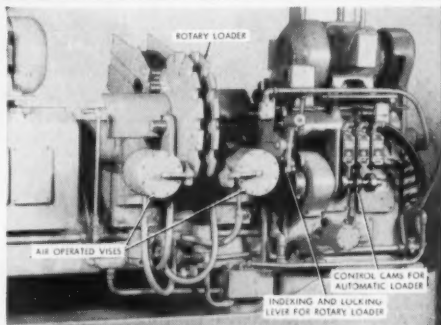
BEARING TUBES HANDLED AND MACHINED AUTOMATICALLY ON MODEL CS DRILLING AND CENTERING MACHINE

PROBLEM: To automatically load and unload Bearing Tubes, bore both ends for a depth of 1-5/8", face to length and chamfer inside and outside diameters on both ends.

SOLUTION: The Model CS Automatic Drilling Machine selected for this job was equipped with Special Rotary Type Automatic Handling Equipment and Semi-standard, Air-Operated Vises shown in the illustration.

The tubes, previously cut to length, arrive by conveyor and are fed by gravity into the rotary loader from the loading chute mounted on the front of the machine. The rotary loader is indexed in timed relation to the machine cycle and carries the parts into working position where they are clamped in the air-operated vises.

The tubes are accurately located endwise in the vises by means of a fixed stop on one end and a spring-loaded pressure arm on the opposite end. After the parts are securely clamped, the cutter



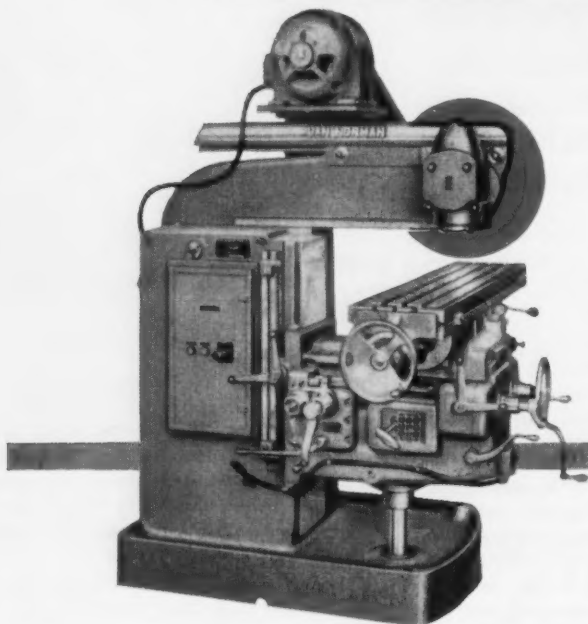
heads advance in rapid traverse, slow down to normal feed during the boring, facing and chamfering operations, and then return in rapid traverse to the starting position. The vise jaws open as soon as the tools clear the work, and the rotary loader indexes a rough part into working position while discharging the finished part into the discharge chute.

The operation is entirely automatic. One operator can look after several machines. A production of 265 pieces per hour is easily maintained. Seneca Falls engineers are at your disposal to help solve your AUTOMATION problems.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

PRODUCTION COSTS ARE LOWER WITH Lo-swing

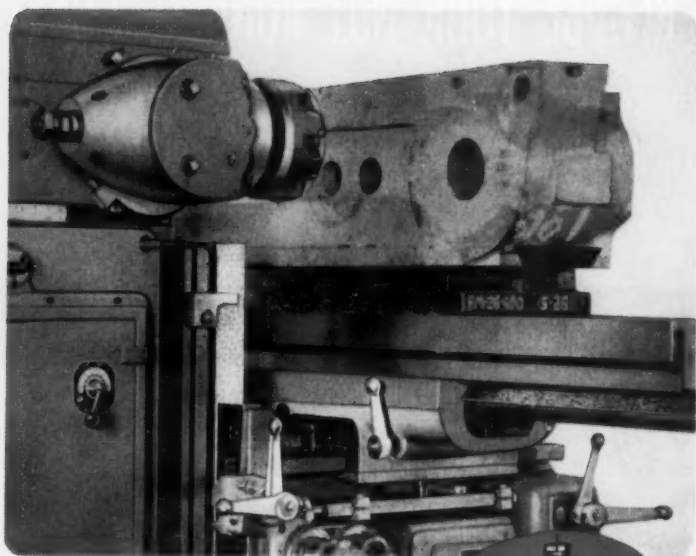
...EVERY
Van Norman Ram Type Miller
Gives You EXTRA "CUT-ABILITY"
that INCREASES Production



No. 38-M Ram Type Miller
Table: 64" x 14"
Cutterhead Spindle Motor: 10 H.P.
Feed Motor: 1½ H.P.
Ram Movement: 29"
18 Feeds; 12 Speeds

VAN NORMAN

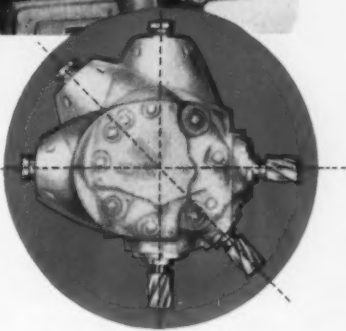
MANUFACTURERS of—Ram and Column Type Milling Machines, Cylindrical Grinders, Spline and Gear Grinders, Oscillating Radius Grinders, Special Production Grinders, Centerless Grinders.



You simply can't beat the new Van Norman Ram Type Millers for "Cut-Ability". The powerful spindle motors drive the cutterhead only . . . provide ample power for every milling cut with all types of cutters including *carbide cutters*. The extra heavy movable rams plus larger, heavier column, base and knee, saddle and table assemblies provide maximum rigidity.

Find out how you can increase production, cut milling costs with the new modern Van Norman Ram Type Millers. Write:

Don't wait . . . for extra profits install a Van Norman machine now! They are available on four purchase plans — Outright sale . . . Purchase on conditional sales contract up to 5 years . . . Straight lease . . . Lease with option to buy. See your dealer or write Van Norman Company.



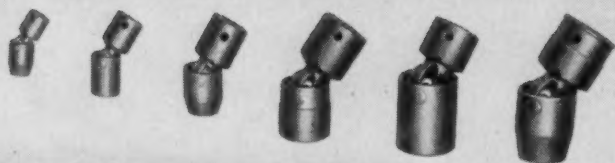
**Adjustable cutterhead
permits horizontal,
angular or vertical
milling on
ONE MACHINE**

COMPANY!

SPRINGFIELD 7,
MASSACHUSETTS

For more data circle 224 on Reader Service Card

REDUCE YOUR NUT RUNNING COSTS



with APEX universal wrenches



Nut running is faster and safer with Apex impact quality universal wrenches. Faster—because these tools are designed to provide power closer to the work. Safer—

because these tools have non-locking construction to prevent catching or binding, even when operating at extreme angles. Complete information will be found in Catalog 29. Write, on your company letterhead please, for your copy.

APEX

nut running tools

THE APEX MACHINE AND TOOL COMPANY
1027 So. Patterson Blvd. • Dayton 2, Ohio

For more data circle 225 on Reader Service Card

the ONE COMPLETE Tool Line



**You Can't Afford to Miss
at the A. S. T. E. Western
Industrial
Exposition**

Yes, for the best answer to every tooling need, Davis is the one line you'll want to inspect with care. It offers you unrestricted selection from the broadest standard line of boring, turning and planing tools . . . plus the most advanced and efficient special-engineered tooling designs produced in the industry.

DAVIS

BORING TOOL DIVISION OF

**Giddings & Lewis Machine Tool Company
Fond du Lac, Wisconsin**

Booth 454

**SHRINE AUDITORIUM
AND EXPOSITION HALL**

THE ONE NAME THAT CERTIFIES ULTIMATE PRECISION AND PRODUCTIVITY IN TOOLING

**This press
pays for
ITSELF!**



Replaces kick presses



Reduces worker fatigue



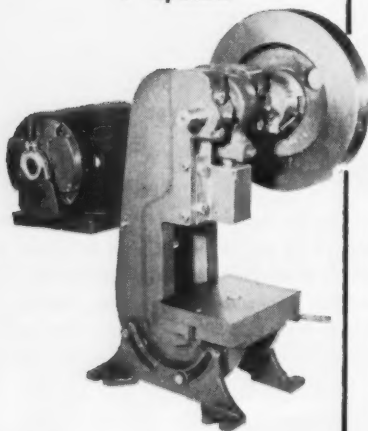
Ideal for stamping
and punching



For assembly and
other operations



$\frac{3}{4}$ " stroke
1" optional



PRESS-RITE

NO. 00

2 TON POWER PRESS

"Rugged, durable and precise" is the way to describe this Press-Rite heavy-duty 2 Ton Press. Thousands of users acclaim its many advantages. Engineered for hard service, ideal for punching and stamping smaller parts. Reduces operator fatigue and eliminates many manual operations.

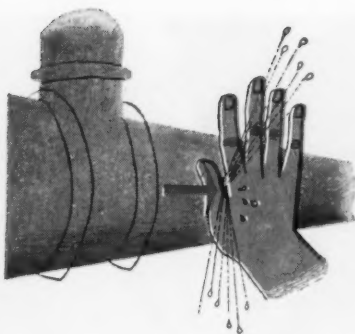
Write today for low prices
and complete information!

SALES SERVICE MACHINE TOOL CO.

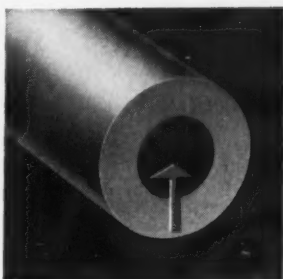
PRESS-RITE PRESSES • SHAPE-RITE SHAPERS • KELLER
POWER HACK SAWS

**2355 UNIVERSITY AVENUE
ST. PAUL 14, MINNESOTA**

For more data circle **227** on Reader Service Card



a hole here means trouble...



a hole here saves trouble

Crucible Hollow Tool Steel Bars are a great trouble-saver for the metalworking industry. For they eliminate costly, time-consuming drilling, boring, cutting-off or rough-facing operations. And you save production time, machine capacity, and avoid scrap losses . . . for the hole is already in the steel you buy.

Crucible Hollow Tool Steel Bars are now available in any of our famous tool steel grades . . . in almost any combination of O.D. and I.D. sizes. And you get immediate delivery of five popular grades — KETOS oil-hardening, SANDERSON water-hardening, AIRDI 150 high-carbon high-chromium, AIRKOOL air-hardening, and NU DIE V hot-work tool steels.

Let your Crucible representative show you how these easy-to-use Crucible Hollow Tool Steel Bars can save you time and money. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.*

Visit us at Booth 350, Western Metal Show
Los Angeles—Mar. 28-Apr. 1

CRUCIBLE

first name in special purpose steels

Crucible Steel Company of America

For more data circle 228 on Reader Service Card

March, 1955

MODERN MACHINE SHOP 29

PLATED UNBRAKOS AT WORK



UNBRAKO FORMULA FOR PLATED SCREW QUALITY. Make the screw precisely undersize with the finest machines. Plate it under rigidly controlled conditions in the best available plating equipment. Guarantee the finished product—Class 3A thread tolerance after plating. It is this unique formula that permits us to supply, with extremely good delivery, the plated UNBRAKO socket head cap screws for such precision applications as this high-speed centrifugal separator used in the processing of fish oils. The story of plating at SPS is told in "Precision Plating—a product and a service." See your authorized industrial distributor or write on your business letterhead for a copy of it. **STANDARD PRESSED STEEL Co., Jenkintown 22, Pa.**



SOCKET SCREW DIVISION



JENKINTOWN PENNSYLVANIA

For more data circle 230 on Reader Service Card

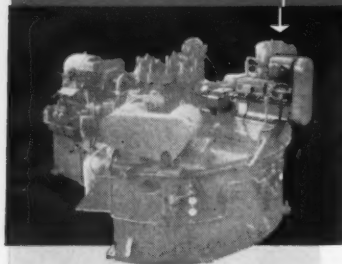
New MORRIS

AIR·OIL· MATIC

DRILL UNITS

Unit Type Six-Station automatic indexing machine for drilling, tapping and facing a master brake cylinder. The Air-Oil-Matic unit shown drills two .026" diameter holes at 10,000 R.P.M. in cast iron.

air power •
hydraulic control
or all-hydraulic
models



CONDENSED SPECIFICATIONS

Length, width, height	33 1/4" x 11" x 23"
Maximum HP at 1800 rpm	2 HP
Spindle speeds	133-4900 (Standard) (Special speeds on request)
App. maximum thrust	650 lb.
Maximum drill size	3/4"
Maximum stroke	6"
Maximum feed stroke	4 1/2"
Feed rate range	0 to 48"/min.
Quick approach rate	480"/min.
Quick return rate	300"/min.

**perfected to give exceptional versatility
for higher production at lowest cost**

Here's the automatic drilling unit you've been looking for! The Morris AIR-OIL-MATIC Drill Unit is a powerful package of precise versatility developed and perfected by one of the nation's leading manufacturers of high production drilling machinery. Now, this compact unit (air or oil powered and hydraulically controlled) is available for your use in special purpose machines.

Designed for a wide range of drilling, reaming, chamfering, spot facing, hollow milling, centering and related operations, it can be mounted in vertical, angular or horizontal positions. The Morris AIR-OIL-MATIC Drill Unit has adjustable feed rate, feed stroke, total stroke. Controls and actuating devices can be set to provide almost any desired sequence of operations. (see condensed specifications)

If you have mass production operations involving drilling or related operations . . . you'll want to know all about the Morris AIR-OIL-MATIC Drill Unit. New literature describing the unit, its advantages and applications and complete with specifications, is available on request.

Morris MACHINE TOOL COMPANY

934 HARRIET ST., CINCINNATI 3, OHIO



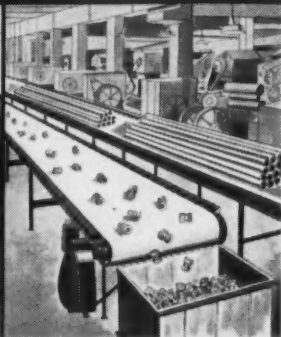
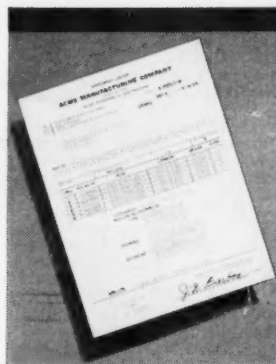
For more data circle 231 on Reader Service Card

A
S
Q

AVAILABILITY
SERVICE
QUALITY

you get all three with

B & W CARBON STEEL SEAMLESS MECHANICAL TUBING



A **AVAILABILITY**
Buying convenience through a single source of hot-finished and cold-finished carbon steel tubing, produced in a wide range of grades and sizes.

S **SERVICE**
You can save through the dependable assistance of B&W Regional Representatives and qualified distributors, trained to help solve fabrication problems and to assist in tube selection.

Q **QUALITY**
Mechanical properties, machinability, tolerances and surface finishes combined for ease of fabrication in your specific application.

remember

A
S
Q

is meant for you.



**THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION**

Beaver Falls, Pa.—Seamless Tubing, Welded Stainless Steel Tubing
Alliance, Ohio—Welded Carbon Steel Tubing

TA-4048 (CSM)

For more data circle 232 on Reader Service Card



Features Essential to Top Hack Saw Blade Performance

High Speed Steel Teeth

Electric Welded

UNBREAKABLE—to saw FASTER.

Composite construction (a narrow high speed steel tooth edge electrically welded by the MARVEL-invented process to a tough, non-brittle alloy steel body), means that MARVEL high-speed-edge can be subjected to the MAXIMUM feed pressure that any hack sawing machine is capable of applying. MARVEL blades need not be "babied" for fear of breakage!

SHATTERPROOF—for SAFETY.

MARVEL blades never shatter or "explode" as do the ordinary "brittle" blades shown at left which so often cause personal-injury accidents such as the loss of an eye or severe laceration and expensive damage to the sawing machine. Operators who use MARVEL blades exclusively soon "get the habit" to apply heavier feeds, greater blade tension, higher speeds—to do their work faster, because they know they are SAFE with MARVEL.

SHARPER, PREMIUM-STEEL TEETH—to wear LONGER.

Teeth are accurately machined by a MARVEL-invented process that assures sharper tooth points and positive uniformity of tooth shape and degree of set from end-to-end of every MARVEL blade. The steel used in the tooth edge is carefully selected from the finest high speed steels available throughout the world, regardless of cost or source—truly premium steels, without premium cost.

QUALITY CONTROL—to assure UNIFORMITY.

With more than a quarter century of experience in inventing, perfecting, and producing welded-edge hack saw blades, MARVEL has provided its own laboratory with the most modern metallurgical instruments and techniques known to the applicable sciences for the specific purpose of maintaining highest possible quality control. Coupled with rigid tests and meticulous inspection of every MARVEL blade, uniform quality is assured.

These are only a few features that make MARVEL High-Speed-Edge Blades such outstanding performers.

Ask for the latest MARVEL Cutting Tool Bulletin and the name of your closest MARVEL Distributor.

Manufactured only by

ARMSTRONG-BLUM MFG. CO. • 5700 West Bloomingdale Avenue • Chicago 39, U.S.A.

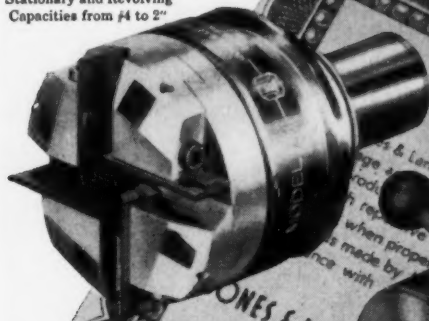
For more data circle 233 on Reader Service Card



Jones & Lamson dies are your best buy . . . whether you need Class III or not. They give you extra savings because of our system of "no approximation" . . . a factor that also applies to Class I and II. So, whatever your requirements, Jones & Lamson's *written* Class III or better Guarantee means

IMPORTANT SAVINGS regardless of tolerance requirements — NOT SOMETIMES . . . EVERY TIME!

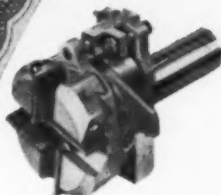
TANGENT CHASER TYPES
Stationary and Revolving
Capacities from #4 to 2"



GUARANTEE
Jones & Lamson Thread Chasers contain
chrome and are guaranteed to give
long service when properly used. All
repairs and replacements made by
Jones & Lamson at no charge.

JONES & LAMSON
Springfield, Vt.

RADIAL CHASER TYPE
Capacities from
#8 to 4 1/4"



**FOR BROWN & SHARPE AUTOMATICS
and SMALL TURRET LATHES**
Capacities from #0 to 1 1/4"



J & L die heads also offer: low initial cost, ease of operation, controlled resharpener, use of carbide tipped chasers where applicable.

JONES & LAMSON

*Machine Tool Craftsmen
Since 1835*

JONES & LAMSON MACHINE CO., 521 Clinton St., Dept. 710, Springfield, Vt., U.S.A.



THREAD TOOL DIV.

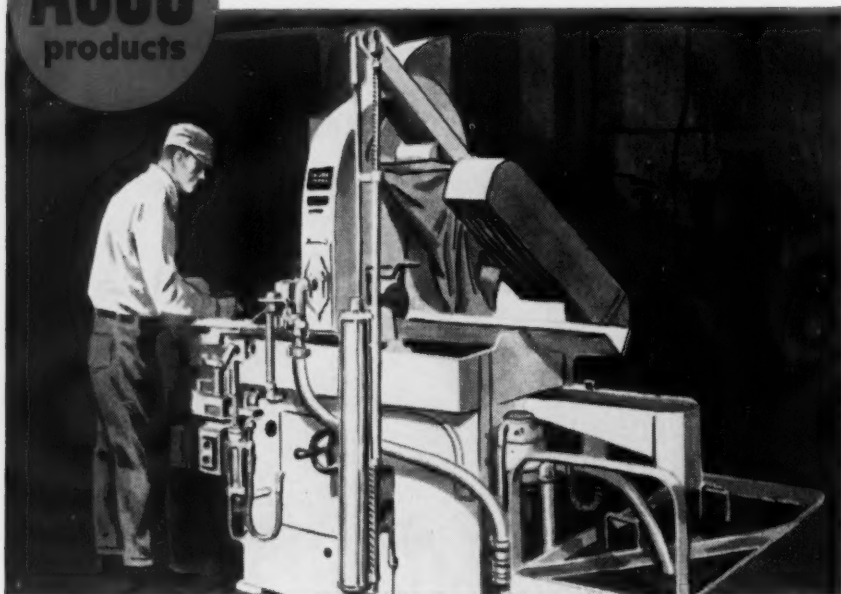
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March, 1955

MODERN MACHINE SHOP 35

ACCO
products

Campbell Abrasive Cutters



**Reduce cutting time on alloy and high carbon steel
from minutes to seconds . . .**

• CAMPBELL Abrasive Cutters reduce your labor costs and the number of machines required. They do it by cutting alloy and high carbon steel in seconds instead of minutes. They give you a clean, smooth cut without work-hardening, and often eliminate finishing operations.

A complete line of CAMPBELL Abrasive Cutters—fully and semi-automatic—are available to fit your specific cutting requirement. CAMPBELL sales engineering experts will help you select the cutter your work demands. They will consult with you on cutting problems.

Why not increase YOUR cutting output per man hour? Write for Bulletin DH-301 on "The Principles of Abrasive Cutting."

ACCO



**Campbell Machine Division
AMERICAN CHAIN & CABLE**

931 Connecticut Avenue, Bridgeport 2, Connecticut

For more data circle 235 on Reader Service Card

**Wet and Dry
Cutters and
Nibblers**

YOU GET ALL DRILL AND NO FRILL

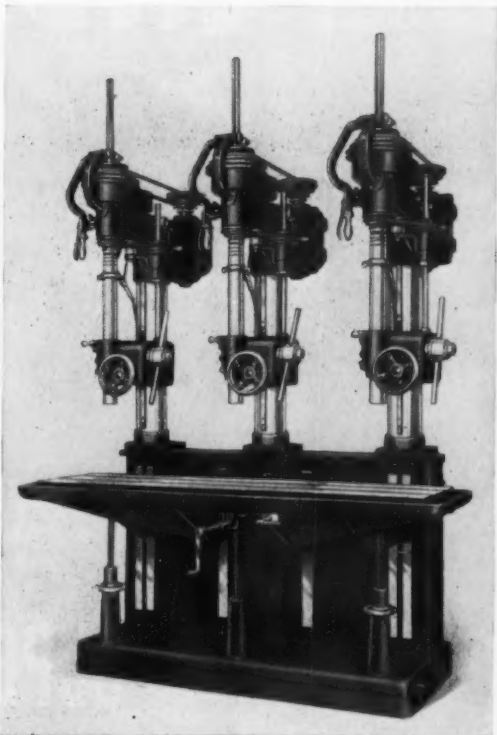
when you specify

"Buffalo"

From 78 years in the business, we know what features in a drilling machine are going to give you lower cost drilling, reaming and tapping. We also know there's no short cut to this quality construction—and that fancy medallions, chrome trim and sales-appealing gadgets *don't* contribute to better drilling. Thus, in "Buffalo" Drills, you'll find only *proven* features like the following:

- 6-spline alloy steel spindle mounted in precision ball bearings
- Controls positioned for the convenience of the operator
- Provisions for fast, easy setup adjustments
- Overall rigid, sturdy construction for lifetime use

This is what we call the "Q" Factor—the built-in Quality which provides trouble-free satisfaction and long life—in every "Buffalo" Drill you buy.



The BIG Drills that handle as easily as smaller, sensitive drills! "Buffalo" No. 22 Drills stand 94" to 96" high, have 1 1/4" capacity in mild steel—yet have all controls and adjustment cranks within easy reach. Write for Bulletin 2989-G for full details!



BUFFALO FORGE COMPANY

388 BROADWAY

BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING

•

PUNCHING

•

SHEARING

•

BENDING

For more data circle 236 on Reader Service Card

DEPENDABLE



HARTFORD SUPER-SPACERS

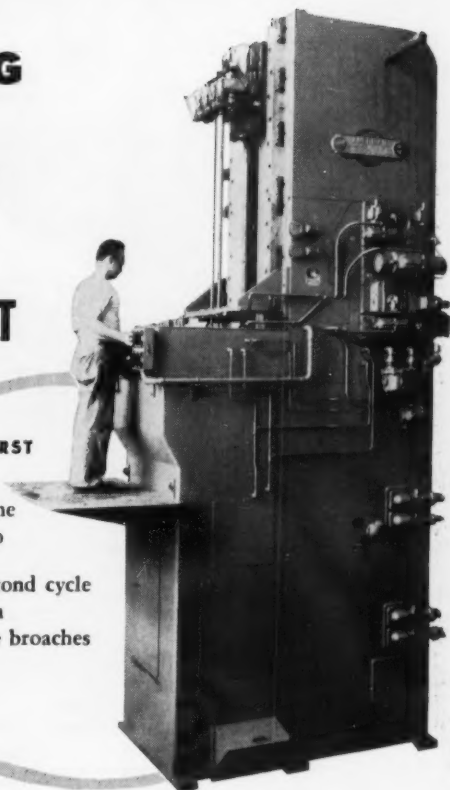
THE HARTFORD SPECIAL MACHINERY CO., HARTFORD 12, CONN.

For more data circle 237 on Reader Service Card

American
BROACHING
gives you
FLEXIBILITY
plus
HIGH OUTPUT

ANOTHER *American* FIRST

- 30 different universal joint yokes broached on one machine
- Broaching strokes from 48" to 72" used to broach parts
- Variable speeds—35 to 45 second cycle
- Two or four station operation
- Combination round and spline broaches
- Up to 400 parts per hour



Whether you need flexibility in broaching — to enable one machine to handle many parts — or volume production on a single part, American engineering will give you the combination of broaching machine, fixtures and broaches that will assure you maximum high output. To get American's recommendations, write today giving details of your broaching requirements —or ask for new Catalog 450.

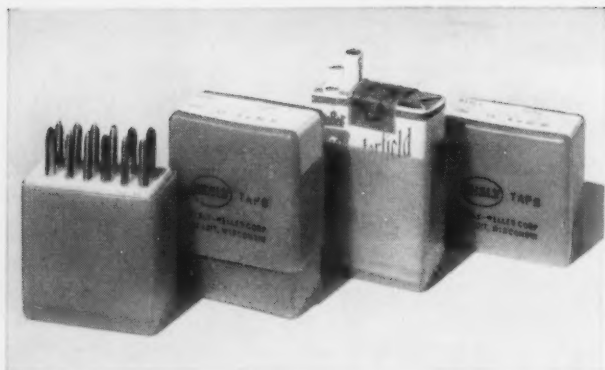


American **BROACH & MACHINE CO.**
A DIVISION OF SUNSTRAND MACHINE TOOL CO.
ANN ARBOR, MICHIGAN

See *American* First — for the Best in Broaching Tools, Broaching Machines, Special Machinery



For more data circle 238 on Reader Service Card



New Besly Tap Package not only protects taps from damage, but can also be re-used to hold cigarettes, fish-hooks or other small tools.

MODERN TAP—MODERN PACKAGE

Now, Besly Tap quality is protected by a unique plastic "slip-together" case. It's so resilient it can be dropped or banged about without harming the taps inside. A plastic foam filler holds the taps firmly in position to prevent damage during shipment and storage.

Used to hold taps 0-80 through 5/16" in size, the new case even makes identification easier. It comes in different colors which indicate the type of tap inside.

Orange is used for high speed ground thread taps, red for high speed cut thread taps and white for carbon taps. An easy-to-read label on the top gives size, quantity, etc. The case is oil and grease resistant, is easily cleaned and will not deteriorate.

This new case is one more example of the greater quality you get when you order Besly Taps. Their accuracy at all vital points assures better threaded holes, faster cutting and longer life. But don't just take our word for it—see for yourself. Ask for a trial in your own plant—on the type of material you ordinarily tap. This is one trial that can mean big savings for you in machine time and tool costs. Call your Besly Distributor or write:



BESLY-WELLES CORPORATION

Established as CHARLES H. BESLY and COMPANY in 1875

108 Dearborn Avenue
BELOIT, WISCONSIN

For more data circle 239 on Reader Service Card



from interchangeable parts...

Danly Die Set Service is Faster!



Choose the Danly Branch closest to you—

BUFFALO 7	1807 Elmwood Avenue
CHICAGO 50	2100 S. Laramie Avenue
CLEVELAND 14	1550 East 33rd Street
DAYTON 7	3196 Delphos Avenue
DETROIT 16	1549 Temple Avenue
GRAND RAPIDS	113 Michigan Street, N.W.
INDIANAPOLIS 4	5 West 10th Street
LONG ISLAND CITY 1	47-28 37th Street
LOS ANGELES 54	Ducommun Metals & Supply Co., 4890 South Alameda
MILWAUKEE 2	111 E. Wisconsin Avenue
PHILADELPHIA 40	511 W. Courtland Street
ROCHESTER 6	33 Butler Street
ST. LOUIS 8	3740 Washington Blvd.
SYRACUSE 4	2005 West Genesee Street

One of the main reasons for Danly's faster die set service is the *interchangeability* of die set parts achieved by Danly. It starts at the main Danly Plant where die set components are produced to Danly's traditional high quality, precision standards. The faster service cycle continues at all of the Danly Branch Plants where thousands of *interchangeable* die set components are stocked. The cycle is completed at the Danly Branch in your area where these parts are assembled as a die set to meet your specific requirements and shipped as soon as your order is received. So remember—for the best in die sets in the shortest time, the place to call is your local Danly Branch.




DANLY MACHINE SPECIALTIES, INC.

2100 South Laramie Avenue
Chicago 50, Illinois

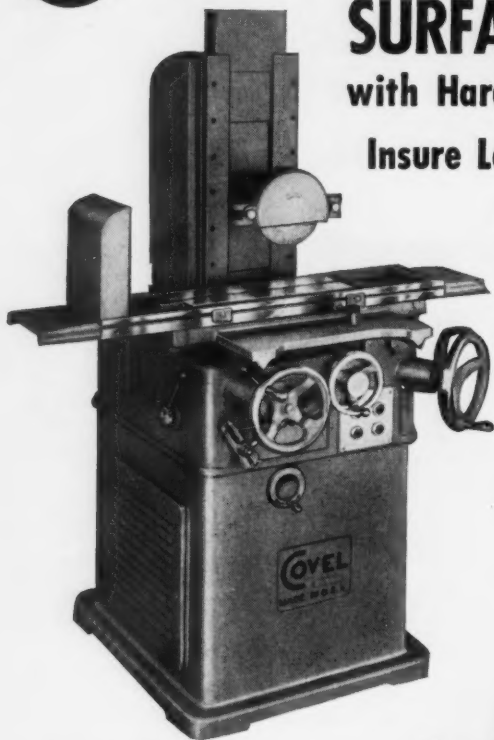


...to finished die sets



COVEL No. 10 ^{6" x 18"} **HAND OR POWER FEED** **SURFACE GRINDERS** with Hard Chrome Table Ways Insure Long-Lasting Accuracy...

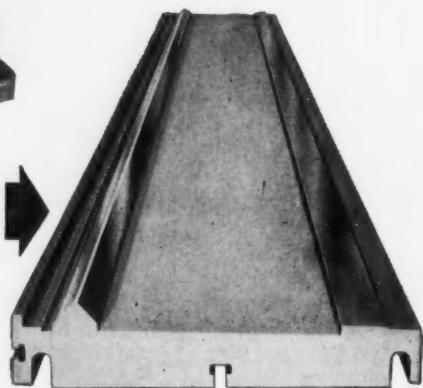
Lower Costs



Replace old, inaccurate grinders now with this low-priced, precision-built, easy-to-operate grinder with latest bed-type construction. Cut manufacturing and maintenance costs on gage, form tool and all-around tool room grinding.

Hard Chrome Table Ways **Reduce Maintenance Costs**

Expensive, time-consuming rescraping of ways is eliminated through Covels special plating process. The Vee and flat ways on tables in service over five years, finished with this wear-resistant surface, show very slight wear, no flaking and no loss of the original built-in precision. Send for descriptive Bulletin M35.



COVEL **PRECISION GRINDERS** **BENTON HARBOR** **MICHIGAN**

For more data circle 241 on Reader Service Card

praise from Caesar...

The Salt Lake Tribune, Sunday, June 20, 1954



Here's the New McGee and Hogan

Radial Drilling Machine

With its 5-foot arm, this modern machine is capable of driving a 3" diameter drill to capacity through the center of a 10-foot diameter solid steel work piece. Also used for tapping and large boring operations, it is the only really modern radial of such dimensions in any intermountain machine shop doing repair work.

Veteran operator Pat Langford, above, finds the centralizing of all controls on this machine a big advantage over old-fashioned, scattered control points. Time saved means lower costs per job.



McGEE & HOGAN
MACHINE WORKS

1154 South 2nd West - Salt Lake City - 84-5291

When a customer of such outstanding caliber and recognized reputation as the McGee & Hogan Machine Works of Salt Lake City, Utah spends his own good money to tell the world how good his new "AMERICAN" Hole Wizard Radial is that's really "Praise from Caesar."

The accompanying McGee & Hogan advertisement appeared in the Sunday, June 20th, edition of The Salt Lake Tribune. It shows the new 5' 13" "AMERICAN" Hole Wizard Radial at work in their plant producing work for customers at "lower costs per job."

Lots of power, wide range, convenient controls and plenty of ruggedness are doing for McGee & Hogan Machine Works exactly what "AMERICAN" Hole Wizard Radials will do for you.

And Mr. Ray Hogan adds another punch to this testimonial by telling us in a recent letter, "Your machines are doing a wonderful job for us."

Send for bulletin No. 327 and get the facts.

THE AMERICAN TOOL WORKS CO.

Cincinnati, Ohio U.S.A.

Radial

ACCO
products

Wilson "Rockwell"* Hardness Testers



**Steel...soft metals or plastics...small parts
or odd shapes...Wilson tests them all
quickly...accurately**

• Recognized as the leader, WILSON "ROCKWELL" Testers set the standards of hardness testing. In the laboratory or on the production line, wherever *exact* hardness must be checked, there is no substitute for WILSON.

Completeness of the WILSON line makes it unnecessary to compromise with makeshift testing methods. The WILSON organization

is nation-wide. Our experts are available not only to help you select the exact tester best suited to your requirements but to consult with you on problems involving hardness tests.

Write for full information on WILSON "ROCKWELL" Hardness Testers, diamond Brale penetrators and accessories.

**Trademark Registered*

ACCO



**Wilson Mechanical Instrument Division
AMERICAN CHAIN & CABLE**

230-G Park Avenue, New York 17, N. Y.

For more data circle 243 on Reader Service Card

**BRALE
DIAMOND
PENETRATORS
AND
ACCESSORIES**

SET A STEADY PACE FOR YOUR TOOLROOM with OLIVER ACE

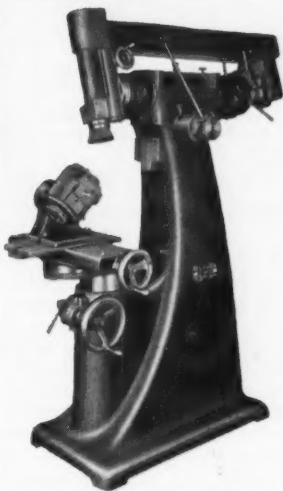
Universal Tool and Cutter Grinders

No "broken" production steps with the Oliver ACE. It reduces time lags to a minimum because its simplicity of design and operation makes economy of motion and fast grinding certain.

The Oliver ACE is so designed that only two simple fixtures are required for a general range of cutters. The ACE is especially built to handle a wider variety of cutter grinding and perform jobs for which ordinary cutter grinders are not designed. The ACE has only one sliding part with ample bearing efficiently protected from dust.

Always insuring lasting accuracy, the Oliver ACE handles the most difficult and the toughest grinding jobs . . . diamond-hard Tungsten-Carbide work and high speed milling cutters and tools are ground with ease. Easy to set-up, the precision built ACE requires no computation. Worker fatigue is greatly reduced because the Oliver ACE permits direct reading for clearance . . . no stoop . . . no squat . . . no squint.

Time proved and soundly engineered, the ACE economizes on floor space . . . saves valuable time . . . gives you guaranteed precision. It substantiates Oliver of Adrian's world-wide reputation as a superior designer and builder of lasting . . . more accurate machine tools.



Priced to meet your budget, the ACE excels for grinding face mills up to 15"—also, slab mills • slitting saws • dovetail cutters • angular cutters • double angle cutters • Fellows helical cutters • reamers • taper reamers • production gashing and carbide tipped circular wood saws.

2 MODELS: Standard and Heavy Duty (illustrated)

Write Today for Complete Data

See our Catalog in Sweet's Directory

OLIVER INSTRUMENT CO.

1430 E. MAUMEE • ADRIAN, MICHIGAN

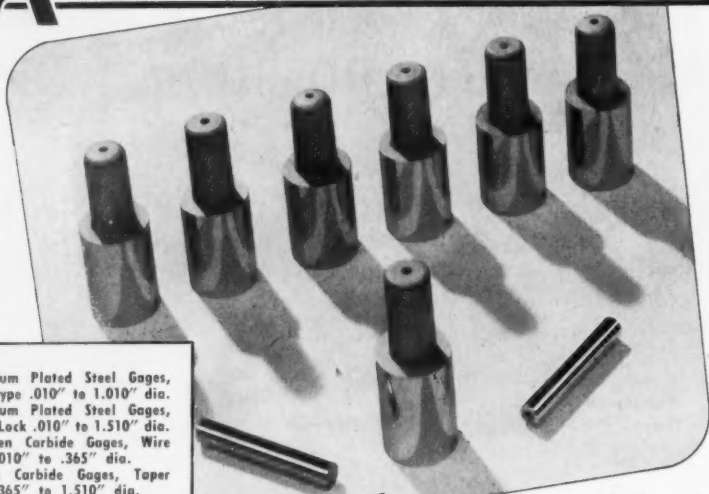
MACHINE TOOLS

by OLIVER include:

AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS
DRILL POINT THINNERS
TEMPLATE TOOL GRINDERS
FACE MILL GRINDERS
DIE MAKING MACHINES

For more data circle 244 on Reader Service Card

VK PLAIN PLUG GAGES *class XXX !!*



Chromium Plated Steel Gages,
Wire Type .010" to 1.010" dia.
Chromium Plated Steel Gages,
Taper Lock .010" to 1.510" dia.
Tungsten Carbide Gages, Wire
Type .010" to .365" dia.
Chrome Carbide Gages, Taper
Lock .365" to 1.510" dia.

*Now available for
fine inspection requirements*

In response to persistent demand, VK has developed and now announces a new, ultra-fine, plain plug gage tolerance of .00001", designated as Class XXX. This new tolerance, half of that of Class XX, satisfies a need, long evident, for gages to meet part limits finer than .0002", and permitting only ten millionths of an inch total variation on the gage in sizes up to .825" diameter, and only fifteen millionths in sizes from .825" to 1.510" diameter. Tolerance may be applied either bilaterally or unilaterally. Inasmuch as Class XXX tolerance must take into account such factors as finer diameter variation, a high order of roundness control, an

exceptional surface finish and an extreme resistance to wear (all of which offset the shallow wear depth inherent in such a gage class), Class XXX is offered in only Chromium Plated and Carbide Gages.

VK Class XXX Plain Plug Gages are furnished in the materials, styles and ranges shown in boxed panel above. VK also furnishes Class XX, X, Y, and Z standard tolerance plug gages in wire type, taper lock and trilock designs. For complete information address: The Van Keuren Company, 175 Waltham St., Watertown, Mass.

"Quality in Millionths"



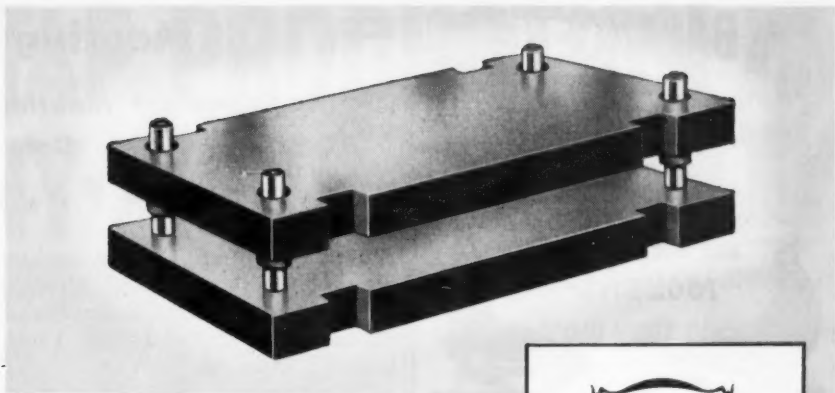
THE *Van Keuren* co.,

175 WALTHAM STREET, WATERTOWN, MASS.

Light Wave Equipment • Light Wave Micrometers • Gage Blocks • Taper
Insert Plug Gages • Wire Type Plug Gages • Measuring Wires • Thread
Measuring Wires • Gear Measuring System • Shop Triangles • Carbide
Cemented Carbide Plug Gages • Carbide Cemented Carbide Measuring Wires
• Chrome Carbide Taper Insert Plug Gages

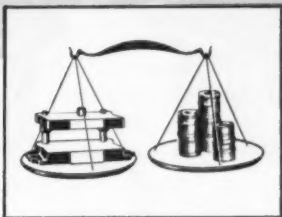


For more data circle 245 on Reader Service Card



FASTER DELIVERY on Both SPECIAL and STOCK DIE SETS

Now . . . you can get into production faster with a Detroit special or standard die set. *First*, because of our greatly expanded facilities, we are now making delivery in less time. For instance, a standard die set will be shipped within 24 hours; specials in remarkably short time. *Second*, because every *full-value* Detroit die set is built up to our high standard and not down to a price and is factory-tested to specifications. Such precision gives you faster mounting without the delay and cost of reworking the set in your shop. Why not talk things over with our nearby representative? Write today.



"full value"

means that in a special or standard Detroit die set you get what you pay for . . . the exact, specified thickness of both die holder and punch holder, true parallelism of surfaces, precision fit of pins and bushings—all assured by precision manufacture, factory assembly and factory inspection.

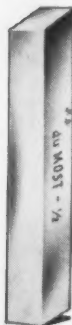


2895 W. GRAND BOULEVARD • DETROIT 2, MICHIGAN
Offices in Principal Industrial Centers

For more data circle 246 on Reader Service Card



Wear resistance, toughness, red hardness — du Mont Bits put all three together. One quality isn't built up at the expense of another. That's why du Mont Bits *do more* — give you more cuts per bit and per dollar — keep their keen cutting edge — last and last and LAST!



Make your own tests of comparative performance and you'll standardize on du Mont H. S. Tool Bits.

Ask us to mail you FREE Tool Bit COMPARISON CHART, CATALOG and PRICE LIST... and the name of your nearest Distributor.

The du MONT Corporation
Greenfield, Massachusetts

For more data circle 247 on Reader Service Card

Meetings

Important Meeting Dates

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

March 14-15 • Steel Founders' Society of America, Annual Meeting, Drake Hotel, Chicago. Society headquarters: 920 Midland Bldg., Cleveland 15, Ohio.

March 14-18 • American Society of Tool Engineers, First Western Industrial Exposition, Shrine Auditorium and Shrine Exposition Hall, Los Angeles. Society headquarters: 10700 Puritan Ave., Detroit 38, Michigan.

March 16-18 • Pressed Metal Institute, Sixth Annual Spring Technical Meeting, Hotel Carter, Cleveland. Institute headquarters: 2860 E. 130th St., Cleveland 20, Ohio.

March 28-April 1 • American Society for Metals, 9th Western Metal Congress and Exposition, Pan-Pacific Auditorium, Los Angeles. Society headquarters: 7301 Euclid Ave., Cleveland 3, Ohio.

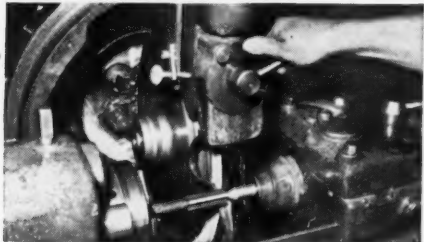
April 13-15 • American Society of Lubrication Engineers, 10th Annual Meeting and Lubrication Exhibit, Hotel Sherman, Chicago. Society headquarters: 84 E. Randolph St., Chicago 1, Illinois.

April 27-29 • Society for Experimental Stress Analysis, Spring Meeting, Hotel Statler, Los Angeles. Society headquarters: P. O. Box 168, Central Square Station, Cambridge 39, Massachusetts.

TAP PRODUCTION IS HY-PRO'S SPECIALTY



HY-PRO SPECIALIZES tap making within every department—from design through all manufacturing operations—to insure the highest-quality product for you.



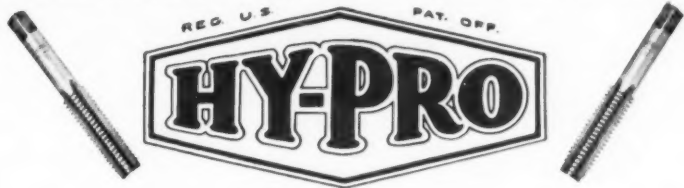
THE HIGH DEGREE OF AUTOMATIC OPERATION in Hy-Pro's production lines means the prompt delivery of your order, while maintaining tolerances down as low as .0001 in.

*... it can help cut man-
hours from your operation*

Tap production is specialized at Hy-Pro. The full staff concentrates their work on this one important line. Every operation in the manufacture of Hy-Pro taps is constantly restudied and re-evaluated to bring you the finest quality product at a minimum cost.

It is this dependable record through the years which has won Hy-Pro their reputation as "*The Tap Specialists*".

It will pay you to get in touch with your Hy-Pro distributor or to call Hy-Pro direct. They offer you a full line of highest-quality taps, backed by the experience of specialized production.



HY-PRO TOOL CO., NEW BEDFORD, MASS., U. S. A.

DISTRIBUTORS IN ALL LEADING CITIES

ADDITIONAL WAREHOUSES:	6046 College Ave. OAKLAND 18, CALIF.	10428 W. McNichols Rd. DETROIT 21, MICH.	11232 Lawler St. (Worth) CHICAGO, ILL.	109 Edison Pl. NEWARK 5, N. J.
	Piedmont 5-4337	University 4-1077	Garden 4-0217	Market 2-4318

For more data circle 248 on Reader Service Card

*Now...modernize your grinding operations
without draining away your capital!*

Take advantage of the **Norton** **Grinding Machine** **Lease Program**

*for low-cost leasing of new
Norton grinders and lappers*

Naturally, you want to meet competition on at least equal terms—with the latest and best in modern grinding equipment.

Yet, like so many other manufacturers, you may want to conserve your working capital—and the cost of replacing inefficient producers is delaying, if not prohibiting your modernization.

What's the answer?

The answer is the Norton Grinding Machine Lease Program, developed to help manufacturers secure the grinders and

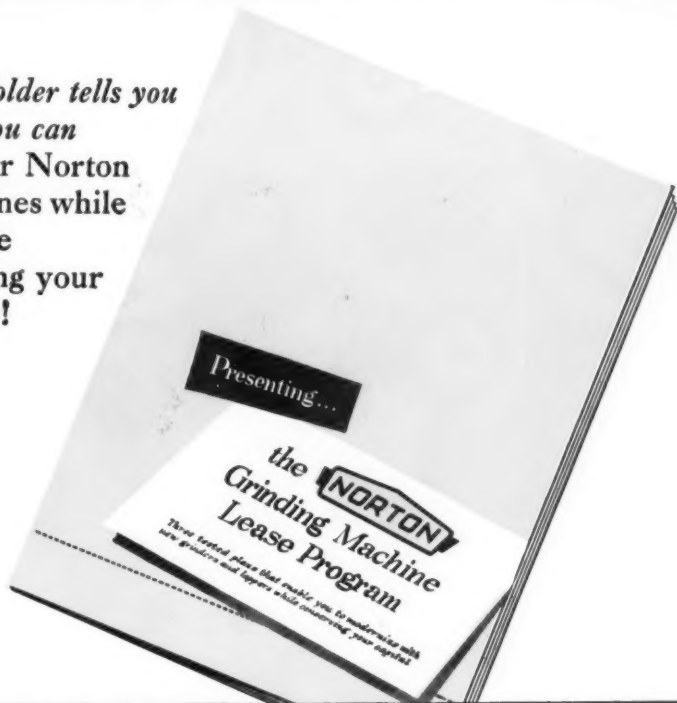
lappers they need for modernization—without weakening their financial position.

The new Norton Program gives you three separate plans for leasing new Norton grinders and lappers, with nominal payments extending over a seven-year period. Each plan meets specific requirements. Each plan is extremely flexible, providing for early termination of the lease, or purchase of the equipment, at your option.

One of these plans may help pave the way to better business for you. Don't miss getting complete facts on them—send in the coupon!

For more data circle 249 on Reader Service Card

*This folder tells you
how you can
pay for Norton
machines while
they're
building your
profits!*



Under the Norton Grinding Machine Lease Program a comprehensive selection of the most popular types and sizes of machines is now available to you, under low-cost, flexible leasing arrangements.

This folder describes the Program, giving details of the three different

plans by which you can improve your competitive position and profits. Send for it now — and remember: only Norton brings you such long experience in both grinding machines and grinding wheels to help you produce more at lower cost.

To Economize, Modernize With NEW



GRINDERS and LAPPERS

*Making better products...
to make your products better*

District Sales Offices:
Worcester • Hartford • New York (Teterboro, N.J.)
Cleveland • Chicago • Detroit

NORTON COMPANY, Machine Division H
Worcester 6, Mass.

Please send me your folder on the Norton Grinding Machine Lease Program.

Name

Title

Company

Address

City.....Zone.....State.....

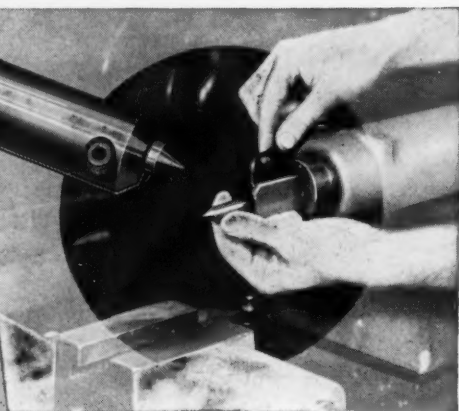
For more data circle 250 on Reader Service Card

NEW *Grip-Tip* CENTERS

CHECK
THESE

Grip-Tip FEATURES

- Long-Life Holders
- Replaceable Carbide Tips
- Easy Insertion and Removal of Male or Female Tips
- Reduced Machine Down-Time
- Lower Cost for Replacement of Carbide Tips
- Carbide Tips Accurate to .0005"
- No Regrinding of Holder
- Carbide Tips Are Easy and Inexpensive to Stock
- Reduced Regrinding Time
- Longer Diamond Wheel Life



with

REPLACEABLE CARBIDE TIPS

Grip-Tip Centers are specifically designed to substantially reduce your replacement costs and machine down-time for regrinding or replacement of worn or chipped centers.

Male or female carbide tips are inserted or removed from the tool steel holders by simply turning a screw. The unique clamping action of holders on tips is positive and quick . . . you save replacement time with Grip-Tip Centers.

The life of Grip-Tip holders is practically unlimited, for, only the dull or chipped carbide tips are

reground. Because the steel holder is not ground when sharpening the carbide tip there is less clogging and longer life for your diamond wheels. Also, the relatively inexpensive double end tips in both male and female types can be stocked with a minimum investment . . . Grip-Tip Centers reduce tool and inventory costs.

Grip-Tip Centers increase your production by permitting full utilization of machine tools. It takes but a minute to remove old carbide tip and replace with a new one . . . machine down-time is less with Grip-Tip Centers.

For Further Information, Write to:

DETROIT REAMER & TOOL CO

2830 EAST SEVEN MILE ROAD • DETROIT 34, MICHIGAN



For more data circle 251 on Reader Service Card

modern machine shop

ADVERTISING REPRESENTATIVES

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Duncan W. Barton, 342 Madison Ave., New York 17, N. Y., Murray Hill 7-7390. Eastern Pennsylvania, Central New York State, New Jersey, Maryland, Delaware, Washington, D. C., Long Island, Brooklyn.

George E. Hay, 431 Main Street, Cincinnati 2, Ohio, MAin 0182. Western Pennsylvania, Western New York, Ohio, Kentucky, Southern Indiana.

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★ ★ ★

modern machine shop
431 Main St. Cincinnati 2, Ohio

March, 1955

Stop and Shop

at Rivett's
production corner

DRAW-IN COLLETS

Stocked in all standard styles...checked 25 times against master gauges... guaranteed to run "dead true" at collet mouth. Write for Bulletin 100.



THREAD TOOL

No operator skill required to produce perfect threads. Duplicates threads without gauging. Mounts on any screw-cutting lathe. Write for Bulletin 110.



LOCKJAW

Set-ups stay put! Grips both downwards and sideways... eliminates bolting and clamping. Used on all table top machine tools. 2 sizes available. Write for Bulletin 140-A.



RIVETT LATHE & GRINDER, Inc.
Dept. MMSA-3

Brighton 35, Boston Massachusetts
For more data circle 252 on Reader Service Card

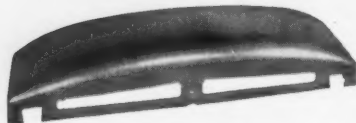
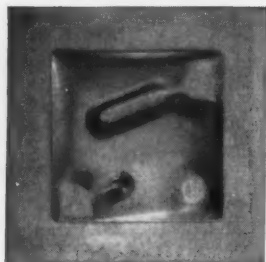
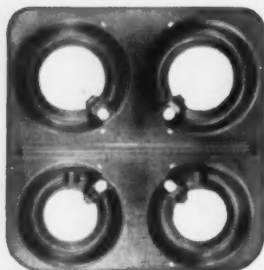
MODERN MACHINE SHOP 53



Plastic Low Cost Tooling

For

Dies... Drill, Welding, and Assembly Jigs



Vulcan, keeping pace with modern tooling, can recommend plastic tooling for medium production on numerous tool programs.

Plastic tools are light in weight, have good impact, compressive strength and dimensional stability. No hand finishing of parts required as galling or marking is eliminated by using plastic form dies.

Contours and odd shapes are cast or laminated to suit individual tools, saving expensive machine and hand finishing operations.

Plastic tools, built in a matter of days instead of weeks, lower your tool costs for those medium production runs.

Our actual production figures prove plastic has a definite place in modern production.

Vulcan Tool Company's organization, building fine tools since 1916, believes new tooling developments must be proved by tool engineers. Since plastic is not a cure-all your problem should be handled by recognized, practical tool men.

Our engineering staff will recommend the correct plastic material and advise if parts of your tooling program should be in plastic.

Send a part print and your production requirements for quotation and recommendations.

Major Vulcan Services . . . Engineering, Processing, Designing and Building . . . Special Tools . . . Dies . . . Special Machines . . . Vulcanomatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and size. Vulcanaire Jig Grinders . . . Motorized Rotary Tables . . . Plastic Tooling.

VULCAN TOOL CO....PLASTIC TOOL DIVISION

727 LORAIN

DAYTON, OHIO

For more data circle 253 on Reader Service Card

NEWEST

SEVENTY FIFTH
BULLARD
ANNIVERSARY

HORIZONTAL BORING MILLING and DRILLING MACHINE

PENDANT CONTROL

Complete machine control
from a movable station for feed
and speed selections,
directional feed and traverse for
Spindle, Head, Table and Saddle.

ADDITIONAL FEATURES

Both Screw and Rack
Feed to the spindle

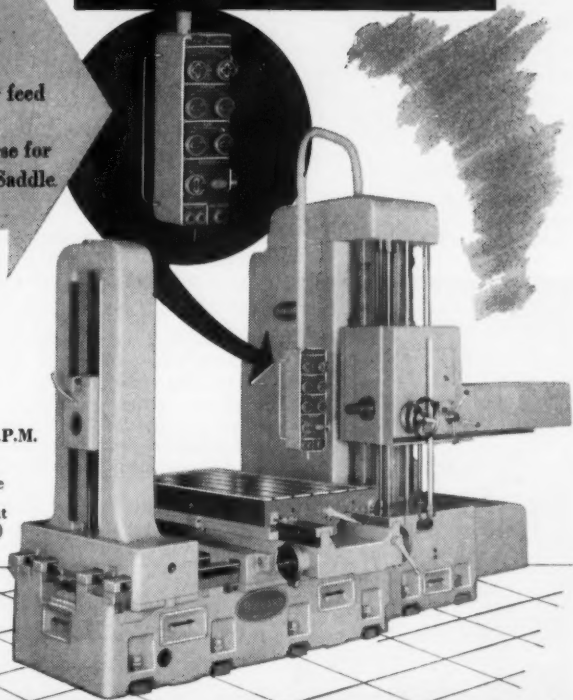
Massive 4-Way Bed, Head,
Headpost and Rear Post
for rigidity

Spindle Speed up to 2000 R.P.M.

Replaceable Ways, chrome
hardened, on Bed and Saddle

Optical measuring equipment
for head and table (optional)

FOR FULL INFORMATION
CALL YOUR NEAREST
BULLARD SALES OFFICE OR
DISTRIBUTOR OR WRITE . . .



THE BULLARD COMPANY | BRIDGEPORT 3,
CONNECTICUT

For more data circle 254 on Reader Service Card



With Permanent
Magnetic Chuck

NEW *Vulcan*

MOTORIZED ROTARY TABLE

for lapping
and grinding

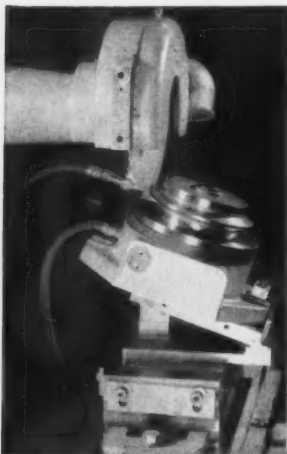
(not an index table)



With Lapping Plate

FASTER
circular precision grinding!

Now with this table and with less effort you assure highest standards of accuracy, flatness, finish and close tolerances. At the same time you eliminate slow and complicated tool setups. You cut grinding time greatly by using only cross feed while the table is rotating at infinite speeds between 40 and 100 RPM.



Work clamped to motorized
table, mounted on sine plate.
Surface grinder application.

For example, Vulcan's Rotary Table can be used in connection with a sine plate or angle fixture. The dressing of large expensive external wheels for side grinding is therefore eliminated. If you wish we can provide permanent magnetic chucks designed for use with our table, both 6" and 10" in diameter.

Vulcan's Rotary Table is an air operated, self contained unit, portable between bench or machine. A precision center hole for locating and tapped holes in the table for clamping provides easy setup. Circular surface grinder applications are many and varied — grind flanged studs or bushings — bearing spacers — forming rolls — cutters — convex or concave surfaces — punches or dies (radius or angle).

Lapping? Yes — and in micro inches. For the 6" and 10" table, lapping plates of 12" and 16" are provided. Perfect for lapping valve plates, gages, bearing spacers and for carbide lapping using diamond powder. Write for circular.

Major Vulcan Services

Engineering, Processing, Designing and Building . . . Special Tools . . . Dies . . . Special Machines . . . Vulcanatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and size. Vulcanaire Jig Grinders . . . Motorized Rotary Tables . . . Plastic Tooling.

VULCAN TOOL CO.

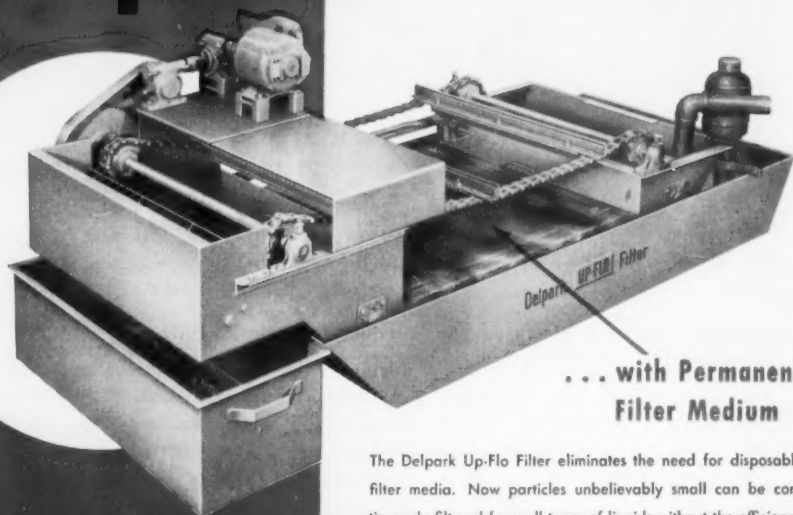
720 LORAIN

DAYTON, OHIO

For more data circle 255 on Reader Service Card

Filters Fine Solids ...

Delpark **UP-FLO** Filter



... with Permanent
Filter Medium

- FULL FLOW
- HIGH EFFICIENCY
- HIGH CAPACITY
- FULLY AUTOMATIC
- SELF CLEANING
- BASIC GRAVITY PRINCIPLE

The Delpark Up-Flo Filter eliminates the need for disposable filter media. Now particles unbelievably small can be continuously filtered from all types of liquids without the efficiency of the filter being impaired. Heavier particles are removed by gravity and the upward flow of the liquid. Smaller fines held in suspension are removed by the permanent filter screen. The deposits are removed by automatically controlled flights which clean the fines from the permanent filter medium and at the same time remove the heavier deposits from the area below the screen. All material is deposited automatically in a tote box for disposal. Your Delpark field representative has the facts on this new development by Delpark engineering, producers of the finest in Industrial Filtration. Write today for more complete information.

Backed by more than 40 years experience in Industrial Filtration

INDUSTRIAL FILTRATION COMPANY, 13 INDUSTRIAL AVENUE, LEBANON, INDIANA

Tough grinding jobs?

Check ***Vulcanaire*** high speed precision grinding heads!

Many seemingly impossible grinding problems have been solved by adapting Vulcanaire to standard machines or by using one of Vulcan's specially designed machines.

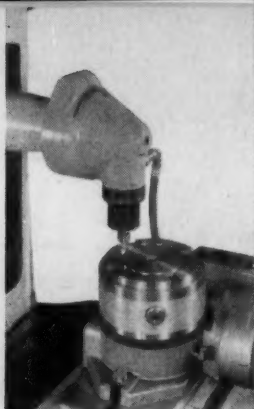
On Surface Grinders, merely remove wheel and guard, clamp vertical or horizontal adaptor to machine as illustrated. No belts necessary. For instance, Vulcanaire used in connection with Vulcan's Rotary Table for Surface Grinders permits the grinding of a circular slot.

Adaptors are in stock to fit the spindle of Vertical Milling Machines for grinding contours, holes and slots.

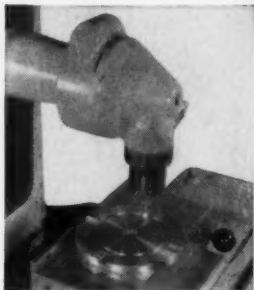
On Internal Grinding Machines Vulcanaire's infinitely controlled speeds furnish the correct surface cutting speed resulting in faster production and micro finish. The adaptor sleeve fits into present housing.

Applied to Jig Boring Machines, Vulcanaire is liked by leading precision manufacturers because its accuracy is guaranteed, producing Vulcanaire jig grinding of large and small parts.

Send us a blue print on your toughest grinding problem. Recommendations and sketches will be returned to you — no obligation.



Grinding circular slot using Vulcan's Rotary Table and Magnetic chuck.



Vertical adaptor for Surface Grinders. Grinding small slots



Horizontal application Grinding a Shoulder Punch.

Major Vulcan Services

Engineering, Processing, Designing and Building . . . Special Tools . . . Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and size. Vulcanaire Jig Grinders . . . Motorized Rotary Tables . . . Plastic Tooling.

NEW!...

Lamina



GUIDE PIN BUSHINGS FOR STANDARD AND SMALL DIE SETS

Now, you can mount Lamina guide pin bushings in standard and small die sets and realize the many advantages that only Lamina offers. These small toe clamp type bushings were developed for use where mounting space is limited . . . designed to retain maximum die area. With bronze electroplated on hardened steel, strength is combined with free, smooth action to eliminate seizing and scoring. Full length bearing surface and precision fit assures perfect alignment and long life. Part rejects are minimized, die life is increased, press downtime and maintenance costs are reduced.

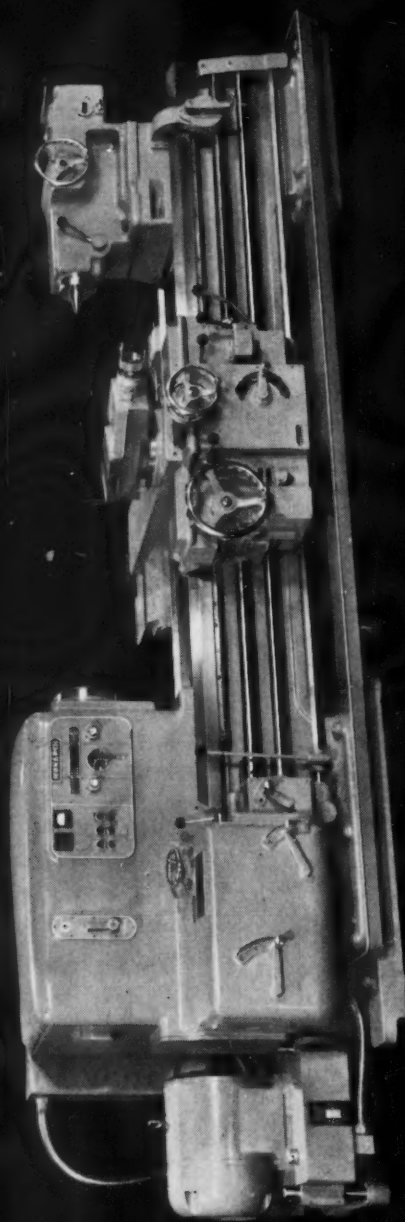
Lamina bushings are pre-finished on the inside diameter *before* assembly. Dimensions remain the same *after* assembly because the bushings are wring-fit in the die and securely held in position by specially designed retainers. Since distortion is eliminated, hand honing or fitting is not required.

These new Lamina guide pin bushings and other Lamina bushings are available in complete selection of styles, lengths, sizes and materials. Prices and dimensions are shown in our new catalog. Contact your die set manufacturer or write direct to us for your free copy.



For more data circle 258 on Reader Service Card

THIS NEW MONARCH HEAVY



The MONARCH SERIES 90 DYNA-SHIFT HEAVY DUTY LATHE—Model 2500: Clearance diameter—40" . . . Swing over cross slide 25"
Model 2501: Clearance diameter—44" . . . Swing over cross slide 31" Model 2502: Clearance diameter—48" . . . Swing over cross slide 36"

THE SERIES 90 DYNA-SHIFT

1. Allows carbide tooling to be used to its fullest advantage.
2. Provides high cycle and metal removal rates above 100 cubic inches per minute.
3. Allows ideal cutting conditions of maximum tool life, heavy stock removal and close accuracy.

DUTY DYNA-SHIFT

Has a Headstock that Thinks!

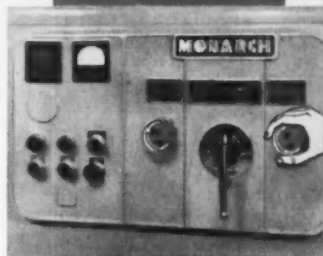
Set Work Diameter Indicator—Get Ideal Spindle R.P.M. in a wink—36 speeds from 6 to 750 R.P.M.

Think you've seen everything in lathes? Take a look! The new Monarch Series 90 Dyna-Shift marks a revolution in lathe design!

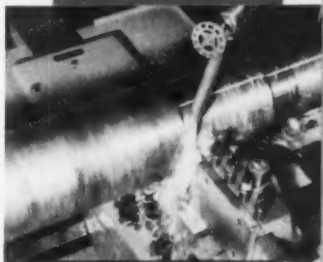
Its heart and soul is the exclusive Monarch Dyna-Shift drive headstock. With it any speed change may be made in seconds with it never being necessary for the operator to calculate the spindle speed (R.P.M.) from the work diameter and the desired surface speed (S.F.P.M.). He merely sets the work diameter indicator to the diameter to be turned. In a wink he gets the correct speed automatically, accurately, positively, and this speed is indicated for reference. What's more, with motor capacity equivalent to 60 H.P., this machine has the power to break and the speed to burn any carbide tool. Here's the ultimate proficiency in the use of carbide tooling—and on work of considerable size.

Imagine a machine with features like these. Imagine it in terms of lowered costs!

You'll want the full story of this great new lathe—for new it is from end to end! The Dyna-Shift and the many other features are revealed in detail in a complete 24-page illustrated booklet. Fill out the coupon today and let us send it . . . It's worth getting! . . . **The Monarch Machine Tool Company, Sidney, Ohio.**



When progressing from diameter to diameter, speed is changed in a few seconds with the flick of one dial. The machine calculates each speed and changes speed automatically.



Monarch



TURNING MACHINES

**FOR A BETTER TURN . . .
TURN THE PAGE 90°
—AND LOOK!**

THE MONARCH MACHINE TOOL COMPANY, Sidney, Ohio
Gentlemen:

- ☐ I am interested in your Dyna-Shift story. Please send me your illustrated Booklet #1601 with complete data.
- ☐ Please have a Monarch sales engineer call on me.

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____



**This is the NEW ERCO
ELECTRIFIED AUTOMATIC
PUNCHING and RIVETING MACHINE**

Electrically activated and interlocked—new hydraulic system for speed control and snubbing action—hydraulic shift—air-driven hopper—electric foot-operated remote control. More efficient and smoother than ever!

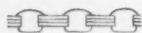
ERCO combines five operations in ONE



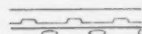
(1) ERCO rivets fit right in the hole—with no burrs or flashing between joints.



(2) ERCO precision Rivet Sets, Rivet Shoes, Strippers and Anvil Posts assure rivet heads concentric with rivet shank.



(3) All heads are uniform because the Anvil Post is adjusted for thickness of material, length of rivet, width and height of upset head.



(4) ERCO Countersunk Rivet Tooling is made for the exact degree of flush head rivet for which it is to be used.

- | | | |
|--|--|-----------------------|
| 1 Punching or Drilling and Reaming holes | 3 Press Countersinking holes for flush head rivets | 4 Hand Feeding rivets |
| 2 Deburring holes | | 5 Heading rivets |

ERCO Automatic Riveters complete all five operations in one, with greater uniformity and strength, in a fraction of the time required for separate operations. What's more, ERCO eliminates many costly drilling jigs or fixtures for added substantial savings.

These machines handle *all types* of solid rivets at speeds up to 35 per minute, meeting the rigid precision standards of the aircraft industry where earlier ERCO models have been in constant service for 15 years.

For complete information, send for illustrated catalog today!

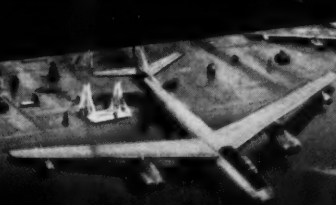
ENGINEERING and RESEARCH

A DIVISION OF **acf** INDUSTRIES
INCORPORATED

RIVERDALE, MARYLAND

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BUTTERFIELD



A COMPLETE LINE OF QUALITY cutting tools is now available from your Butterfield distributor. Milling Cutters are made to the same exacting standards as Butterfield Taps, Dies, Drills, Reamers, Counterbores and End Mills.

UNION TWIST DRILL COMPANY
BUTTERFIELD DIVISION
DERBY LINE, VERMONT, U. S. A.



FOR FAST, ECONOMICAL SERVICE
CALL YOUR **BUTTERFIELD**
DISTRIBUTOR



**“You cannot build
today’s products
with yesterday’s machines
*and be in business
tomorrow!”***

Quote from speech by Dr. W. W. Gilbert
of the General Electric Company
before the Machine Tool Distributors Meeting,
Cincinnati, Ohio. Oct. 19-20, 1954.

We believe that Dr. Gilbert's statement is particularly pertinent to the production of precision gears in quantity. In our 1955 line are the most modern Gear Shapers . . . ready for automatic operation . . . capable of faster stock removal while working to closer tolerances. These machines can save you money by keeping gear quality up and costs down.



New No. 4



New No. 12



H. P.* No. 36

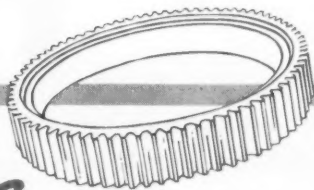
Latest Heavy Duty Gear Shapers—for Production Savings

High Speed No. 4 GS for record-making production on work up to 6" diameter x 2" face.

No. 12 a high-spindle-speed, fast feed machine for all-purpose gears to 12" diameter x 4" face.

No. 36 is in wide use for coarse pitch pinions and gears in all diameters to 36" x 6" face.

**High Production*



THE

Fellows

GEAR SHAPER COMPANY

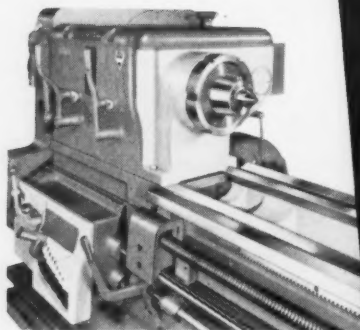
Head Office and Export Department: 78 River Street, Springfield, Vermont

Branch Offices: 319 Fisher Bldg., Detroit 2 • 5835 West North Avenue, Chicago 39 • 2206 Empire State Bldg., New York 1
6214 West Manchester Avenue, Los Angeles 45

For more data circle 264 on Reader Service Card

*double
duty*

Nebel
gap lathes



AS AN ENGINE LATHE

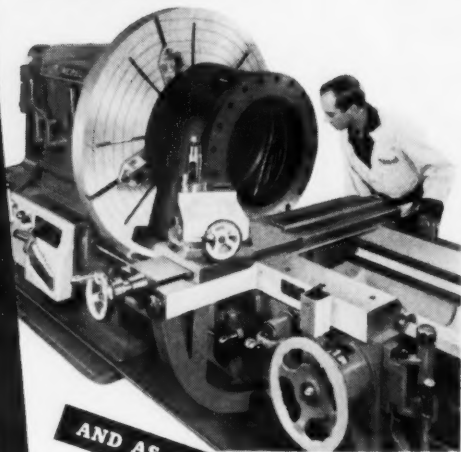


PHOTO COURTESY LUNGEWEIMER CO.

AND AS A GAP LATHE...

Nebel lathes meet U. S. government standards

for Army, Navy, Air Force and atomic energy projects . . .

and have been approved by industry since 1889.

This big Nebel extension bed gap lathe outperforms two standard lathes. Yet it requires the floor space of just one lathe . . . and you make but one investment for this doubly useful, dual purpose lathe.

Nebel gap lathes made in two extension bed gap models: 28" 50" (illustrated) and 20" 40" . . . and in removable block gap models.



send for
descriptive bulletins

• THE NEBEL MACHINE TOOL CO.
CINCINNATI 25, OHIO, U.S.A.

For more data circle 265 on Reader Service Card

*You can spot productive hands
by the company they keep!*



Meeting close tolerances with INDIA® and HARD ARKANSAS* Oilstone Files

Here's a real helping hand for that final touch of precision on tools, dies and parts. These oilstone files make the job fast and easy no matter how intricate the surface. A selection of 35 shapes and 97 sizes to choose from. HARD ARKANSAS for superfine finishes.

Hand Stoning Handbook—contains description of complete Behr-Manning Oilstone line. Address Behr-Manning, Troy, N.Y. Dept. MS-3.



In Canada: Behr-Manning (Canada) Ltd., Brantford.
For Export: Norton Behr-Manning Overseas Inc.,
New Rochelle, N. Y., U. S. A.

0-2

*Trade-marks



Metalite Cloth Spiracords—for deburring and polishing.



Abrasive belts and shaped contact wheel speed contour grinding.



Hard Arkansas file hones feather edge on milling cutter.



BEHR-MANNING

division of NORTON Company

▲ COATED ABRASIVES ▲ SHARPENING STONES ▲ PRESSURE-SENSITIVE TAPES

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What's Best For Non-Ferrous Cutting?

SIMONDS Circular Metal Saws

*Steel Analysis Patented No. 2,204,783



SI-MALOY® STEEL SAWS, made of Simonds patented steel especially developed for sawing non-ferrous metals, provide longer cutting life, greater economy in all but the most abrasive non-ferrous alloys. Costing more than Semi-High Speed Steel Saws, they give more service between sharpenings. Costing the same as High Speed Steel Saws, they're tougher, more break-resistant and hold a cutting edge equally well. Si-Maloy Saws are clearance ground and available in a wide range of stock sizes.

SEMI-HIGH SPEED STEEL SAWS are normally applied where production requirements are limited. Tougher, more resistant to cracking, they're more economical to use on jobs where saws are subject to abuse. Furnished clearance ground or with teeth set for clearance, Semi-High Speed Saws are available in a wide range of stock sizes.

HIGH SPEED STEEL SAWS provide the ultimate in cutting life on all types of non-ferrous alloys, but won't take as much abuse as Si-Maloy Saws. Furnished clearance ground in a wide range of stock sizes. Simonds Steel, modern heat-treating, grinding and production methods insure longer, trouble-free service from every saw with the familiar Simonds ribbon trade mark. Write for Bulletin M-80 for further information.

**For Fast Service
from
Complete Stocks**



Call your

**SIMONDS
Industrial Supply
DISTRIBUTOR**

Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon, Canadian Factory in Montreal, Que., Simonds Division: Simonds Steel Mill, Lockport, N. Y.
Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

For more data circle 267 on Reader Service Card

CAN YOU COMPETE SUCCESSFULLY?

or . . . is out-of-date equipment
putting you out of the running?

Obsolete equipment is a vicious
tax on your costs and produc-
tion. . . it ruins efficiency . . .
make costs spiral sky-high
... puts the KO on your
estimates instead of the
OK you are bidding for.

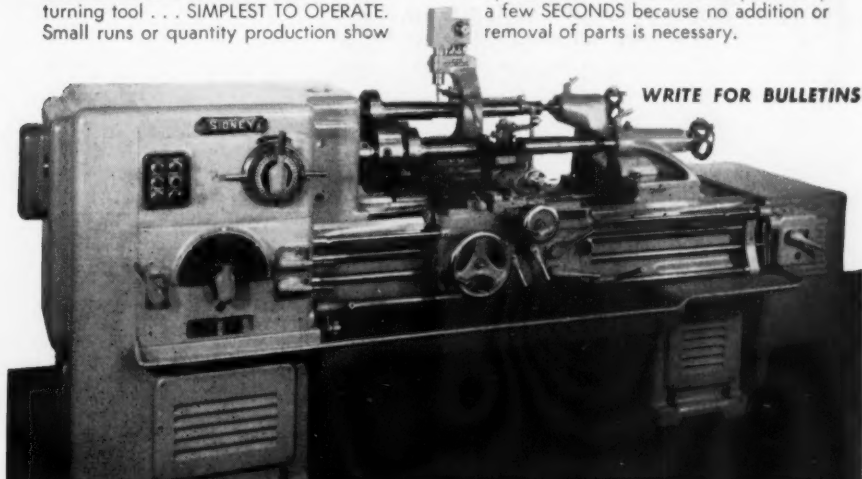
SIDNEY FLUID TRACER LATHES

HELP YOU OVERCOME
COMPETITION

Furnished in connection with any size
or model of Sidney Lathe, the FLUID
TRACER makes it the most modern
turning tool . . . SIMPLEST TO OPERATE.
Small runs or quantity production show

TREMENDOUS SAVINGS PER FINISHED
PIECE. Change-over to standard lathe
operation or back to tracer requires only
a few SECONDS because no addition or
removal of parts is necessary.

WRITE FOR BULLETINS



THE SIDNEY MACHINE TOOL CO. • SIDNEY, OHIO

Builders of Precision Machinery since 1904

For more data circle 268 on Reader Service Card

CUT COSTS WITH MULTIPLE BENDING

Whether you're bending pipes, tubes, reinforcing bars or structural shapes, you can greatly increase your bending production by multiple die bending.

Shown here is our Model A-5 BENDING MACHINE, tooled for bending 3 different radii without changing the set-up. In order to make multiple bending cost no more per die than single bending, individual dies are merely stacked on the die spindle and a shoe of the proper width permits the same degree to be bent without changing the automatic reset switch. The MODEL A-5 will bend pipe up to and including 2" standard weight pipe.

Redesigned and greatly improved, the Model A-5 still sells for only \$1975. F.O.B. factory, U.S. Funds.

Smaller and larger machines available.



*Write for detailed and
descriptive folder.*

PEDRICK TOOL & MACHINE CO.

3640 N. Lawrence St.

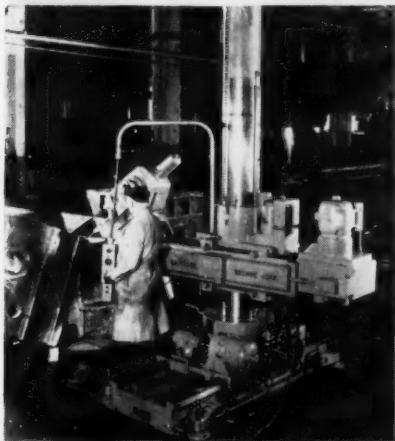
Dept. 5,

Philadelphia 40, Pa., U.S.A.

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Kaukauna At Work....

UNIVERSAL RADIAL DRILLING MACHINES



Drilling angular holes in bore of casting is a job that requires accuracy, fast tool positioning and plenty of power to take full advantage of the highest feeds and speeds permissible with modern cutting tools. Kaukauna Universal Radial Drills have the power, accuracy and stamina to do this work quickly, easily and at low cost. A versatile line of machines with simplified controls, they maintain efficient high production on large, unwieldy workpieces or small production parts, and perform drilling, reaming, boring, counterboring, tapping and spot-facing operations. They do jobs that no other machines can do . . . save time and money.



With extended column, runway and reach, this Kaukauna Universal Radial Drilling Machine is saving set-up time by drilling, tapping, driving studs and spot-facing with speed and accuracy from any angle on diesel engine bases and blocks.

Kaukauna builds Universal Radial Drills and Horizontal Drilling Machines in a range of sizes which meet practically all requirements in modern production practice. Write today for descriptive catalog or ask representative to call.



Kaukauna

MACHINE CORPORATION

KAUKAUNA, WISCONSIN, U. S. A.

For more data circle 270 on Reader Service Card

$$5 + 4 = \underline{100\%}$$

*An Announcement of Special Interest to All Metal Cutting Plants
by the Cincinnati Milling Products Division,
The Cincinnati Milling Machine Co.*

We are pleased to announce that the addition of four new members to the Cimcool® family of five products now permits us to serve industry 100%.

As you know, it was just a few years ago that we introduced our first cutting fluid, Cimcool Standard Concentrate. Born of 25 years of painstaking research and practical experience, this revolutionary coolant is today the largest selling chemical-lubricant cutting fluid in the world.

In recent years we have added four other products, each one uniquely designed to serve a special purpose in industry: Cimcool Water Conditioner for increased rust control . . . Cimcool Tapping Compound, the magic compound that increases tap life . . . Cimcool S-2 Concentrate for heavy duty use . . . and Cimcool Transparent Grinding Fluid, developed for superior rust control at high dilutions.

These original five members of the Cimcool family served 85% of all metal cutting jobs. However, our goal has not been 85%, but *one hundred per cent*. And now, we have at last reached that goal with the introduction of four *new* products—which also have been developed in the laboratory and proved on-the-job:

- CIMCUT BASE ADDITIVE**—For those jobs where an oil-base cutting fluid is required.
- CIMCOOL "CI"**—The cutting fluid for cast iron with exceptional rust control properties.
- CIMCOOL MACHINE CLEANER**—2-phase non-corrosive cleaner that cuts grit, dirt, slime, oil.
- CIMCOOL BACTERICIDE**—The most effective agent yet developed to overcome rancidity.

Our representatives will be happy to give you full details about these nine great products now serving industry 100% . . . and to prove to you, through actual demonstration, that Cimcool products *lower costs . . . and do a better job*.

®Trade Mark Reg. U. S. Pat. Off.

CIMCOOL
Cutting Fluids

100%
for ~~85%~~ of all metal cutting jobs

PRODUCTION-PROVED PRODUCTS OF THE CINCINNATI MILLING MACHINE CO.

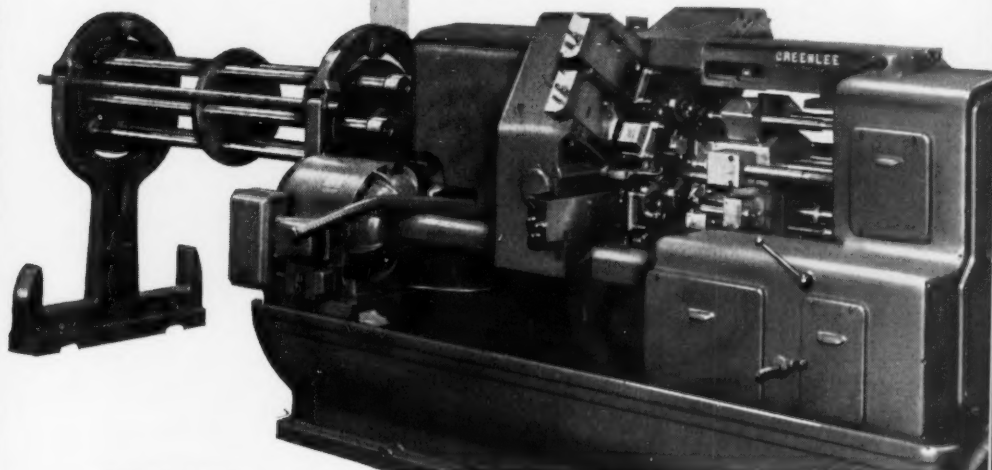
For more data circle 271 on Reader Service Card

PRODUCTION MACHINERY
GREENLEE

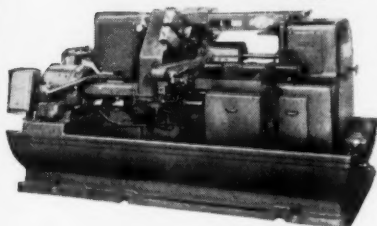
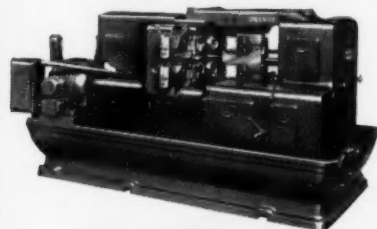
AUTOMATIC BAR MACHINES

INCREASE YOUR PRODUCTION...
LOWER YOUR COSTS!

CUT YOUR SET-UP TIME
SPEED-UP DIFFICULT OPERATIONS



GREENLEE 4-SPINDLE AUTOMATIC



GREENLEE 6-SPINDLE AUTOMATICS

SPECIFICATIONS

Rating	1"	1-5/8"	2"
Chuck Capacity, Round.....	1"	1-5/8"	2"
Chuck Capacity, Hexagon..	7/8"	1-13/32"	1-3/4"
Chuck Capacity, Square...	3/4"	1-1/8"	1-7/16"
Stock Feed.....	6-3/16"	8-5/16"	8-5/16"
Turning Length.....	6"	7-1/2"	7-1/2"
Spindle Speed Range.....	225 to 2500	105 to 2175	95 to 1935
Feed Range per Spindle Rev.	.0014 to .0218	.0017 to .0388	.0019 to .043
Motor Horsepower.....	15	20	25
R. P. M.....	1800	1800	1800
Floor space:			
Length with Stock Reel...	17'-6"	17'-3"	17'-3"
Width.....	5'-0"	5'-4"	5'-4"
Height.....	4'-11"	5'-4"	5'-4"
Net Weight in Pounds.....	14,400	17,940	18,150

GREENLEE 2ND OPERATION AUTOMATIC

Extremely versatile, high-production machines. Parts can be loaded semi-automatically or fully automatically. Incorporates the same basic features... inherent production and operating advantages as the standard 6-Spindle Automatics.

Investigate
Now...
Phone
Rockford 3-4881

PRODUCTION MACHINERY
GREENLEE

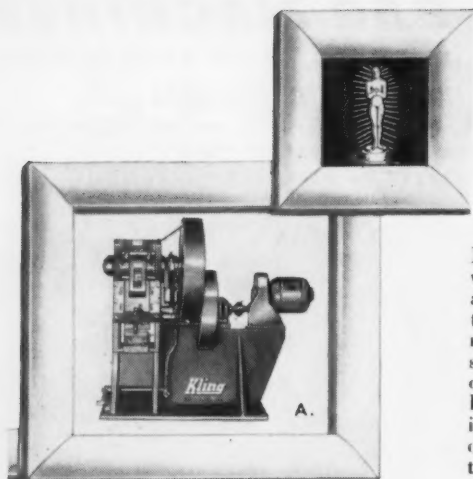
GREENLEE BROS. & CO.

1883 MASON AVENUE
ROCKFORD, ILLINOIS

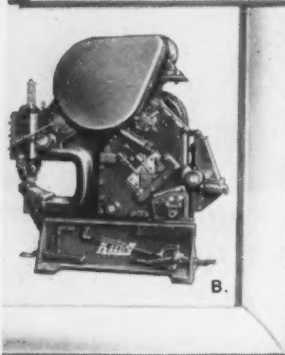
you too, can win a
"PRODUCTION OSCAR"

with one of these
 versatile Kling Shears

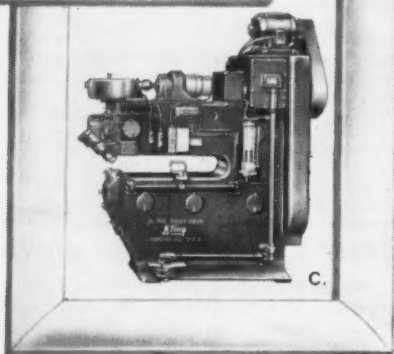
Leading manufacturers are winning widespread recognition with cost-cutting achievements and other problem solutions by installing Kling metal working machines such as the various types of shears shown here. These shears offer only a few examples of the wide range Kling has available for you as indicated in the table below. Write for bulletins on the models in which you are interested, no charge or obligation.



A.

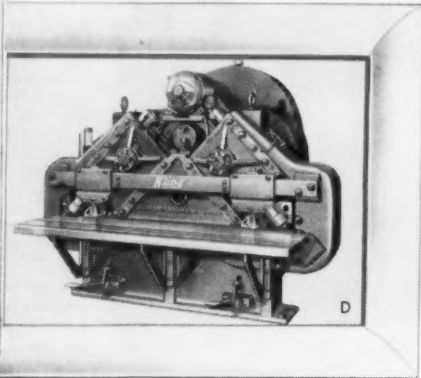


B.



C.

727 MM



D.

- A—GUILLOTINE SHEARS
- B—COMBINATION SHEAR, PUNCH & COPER
- C—ROTARY SHEARS
- D—DOUBLE ANGLE SHEARS

Kling BROS. ENGINEERING WORKS
 1320 N. Kostner Ave. • Chicago 51, Illinois

...an investment in speed!

MANUFACTURERS OF: Combination Shear, Punch & Copers • Double Angle Shears • Rotary Shears • Punches • Plate Bending Rolls • Angle Bending Rolls • Friction Saws

Export Distributor: Simmons Machine Tool Corp., 50 E. 42nd Street, New York 17, N. Y.
 For more data circle 273 on Reader Service Card



Grinding small holes with an Ex-Cell-O
25,000 RPM High Frequency Motorized Spindle

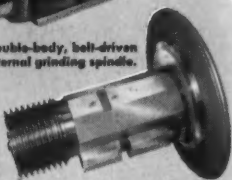
A SPINDLE THAT'S *Built for Your Work*



Single-body, belt-driven
internal grinding spindle.



Double-body, belt-driven
internal grinding spindle.



25 hp heavy duty precision spindle
with 24" grinding wheel.



25,000 rpm high frequency
inbuilt motor spindle.

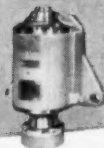


Totally enclosed inbuilt motor
surface grinder spindle.



Precision inbuilt motor
spindle for cutter grinder.

Heavy duty motorized
precision spindle
available up to 20 hp



GET THE MOST FROM GRINDING OPERATIONS BY USING EX-CELL-O SPINDLES MADE FOR THE JOB

Ex-Cell-O Precision Spindles are the original equipment choice of leading grinder manufacturers. They are rigid, smooth-running. For high precision work they are fitted with standard Ex-Cell-O Precision Ball Bearings; for slower speeds and heavier cuts they are equipped with heavy-duty Ex-Cell-O Precision Ball Bearings. Phone your Ex-Cell-O representative or write to Ex-Cell-O in Detroit for grinding spindle catalog.

54-12



EX-CELL-O
CORPORATION
DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION
MACHINE TOOLS • GRINDING
SPINDLES • CUTTING TOOLS •
RAILROAD PINS AND BUSHINGS
• DRILL JIG BUSHINGS • AIRCRAFT
AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

HOW MAJOR INDUSTRIES NOW CUT

Product Costs

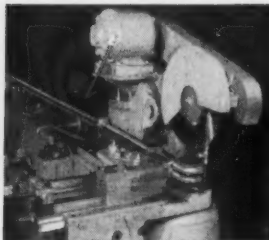


- 2 HOLLOW TRACTOR BOOMS**—Cold bending 12 gal. welded steel tapered tubes without distortion on Size 4 Pines unit eliminates expensive blanking and forming dies, saves tons of material for farm equipment manufacturer.



- 3 EXTRUDED WINDOW FRAMES**—Part of production line setup in large aluminum fabricating plant, this small Pines Semi-Automatic saves space, accurately bends automobile window frame moldings.

- 4 REFRIGERATION AIR CONDITIONING ELLS**—Special Pines Automatic Cut-Off Benders now produce copper ell and return bends at speeds up to 1500 per hour, reduce scrap losses to 1%.



- 1 AIRCRAFT TUBING**—Smooth, extra sharp bends now produced in ultra-thin stainless steel tubing, saves space and \$14,000 per plane for aircraft manufacturer. Shown above, Pines Size 4 Unit forming wrinkle-free 8" c/j radius bend in 4" x .020" S. S. tubing.

with PINES PRODUCTION BENDERS

The examples shown here are a few of the countless number of production jobs that are now handled efficiently and more profitably on Pines Automatic Benders. They illustrate the versatility and the many cost-cutting advantages of cold forming round, square, rectangular, extruded, or hollow stock the "Pines-Way". Simplicity of tooling, uniform accuracy, and ease of operation are proven features of Pines machines which today help hundreds of plants cut product costs. At Pines you'll find an unmatched wealth of bending experience and creative tooling skill readily available to help you develop better methods and save time on production problems.

Write for
Free data sheets

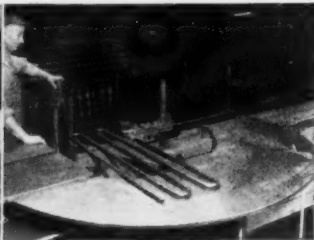
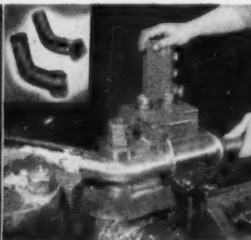
To keep abreast with latest developments in bending, write for copies of "Pines News"—bi-monthly mailing piece that gives facts on new, cost-cutting bending applications.



PINES ENGINEERING CO., INC.
Specialists in Tube Fabricating Machinery 642 WALNUT • AURORA, ILLINOIS

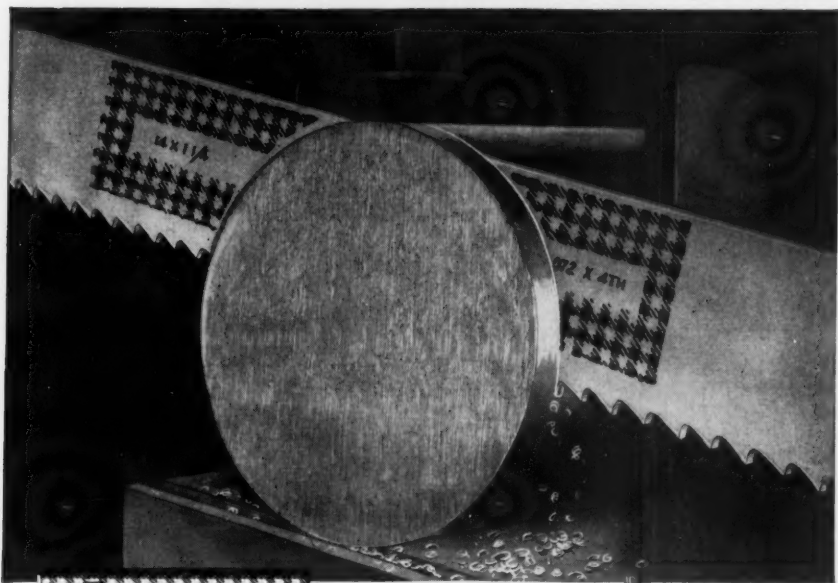
- 5 ENGINE MANIFOLD TUBES**—Short 1 1/4" O. D. steel tube now bent to 1 1/2" c/j radius with flange attached saves space, insures accuracy, cuts costs.

- 6 BOILER TUBE AND REFRIGERATION COILS**—Typical setup bending continuous serpentine coils from 1/2" steel tubing. Reduces welding, fabricating costs. Other installations range from 1/4" copper up to 3" steel tube.



For more data circle 275 on Reader Service Card

When the chips are down



LENOX

POWER HACK SAW BLADES
are best by every test!

QUALITY . . . The very finest in both
steels and workmanship

SERVICE . . . Prompt Deliveries

TECHNICAL ASSISTANCE . . .

Whenever needed on unusual
or difficult cutting problems

These things we pledge to you. The final test is on
your own machines. Try Lenox for yourself . . . on
any job . . . against any other blade in the world.
Then you be the judge.

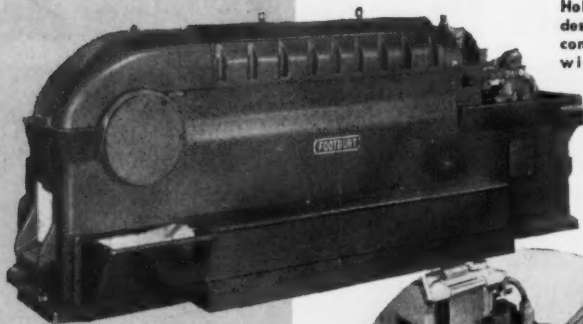


LENOX

**AMERICAN SAW
& MFG. COMPANY**
Springfield, Massachusetts

HACK SAWS BAND SAWS GROUND FLAT STOCK

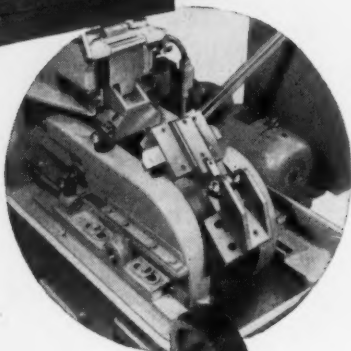
For more data circle 276 on Reader Service Card



Holding fixtures are designed for quick, convenient loading, with automatic clamping, unclamping and unloading.

to cut machining costs
machine faster with...

**CONTINUOUS
BROACHING**



• Higher machining production than ever achieved by any other method has been made possible in many cases through the use of the Footburt Continuous Surface Broaching Machines. In most cases production is limited only by the speed at which parts can be loaded into the self-clamping fixture. Unloading is automatic. If you have a problem of high production on small parts, send blueprints and hourly requirements.

THE FOOTE-BURT COMPANY • Cleveland 8, Ohio
Detroit Office: General Motors Building

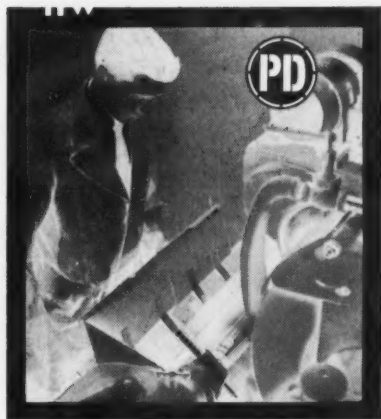
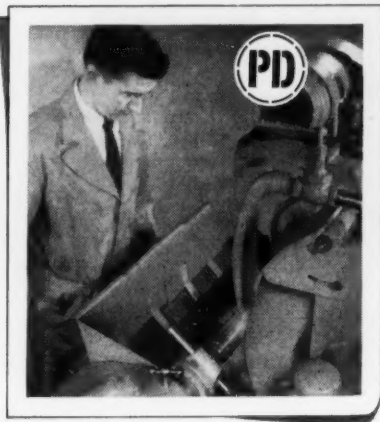
★
engineered
for
production

FOOTBURT
M A C H I N E T O O L S

For more data circle 277 on Reader Service Card

A manufacturing achievement that can save you money

Just as a **NEGATIVE** guarantees you an exact duplication of a photograph each and every time, you are always assured a . . .



... **POSITIVE** Duplication of an original grinding wheel each and every time through the CINCINNATI (PD) Manufacturing Process.

NOW!

Cincinnati Grinding Wheels offer



Positive Duplication

Here is an outstanding development in precision manufacturing and quality control that can *save you money . . . and increase your production!*

Through the CINCINNATI (PD) Manufacturing Process you are assured a Positive Duplication of the original wheel every time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS are priced no higher than ordinary wheels.

Contact Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.



A PROMOTION-PRICED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

For more data circle 278 on Reader Service Card



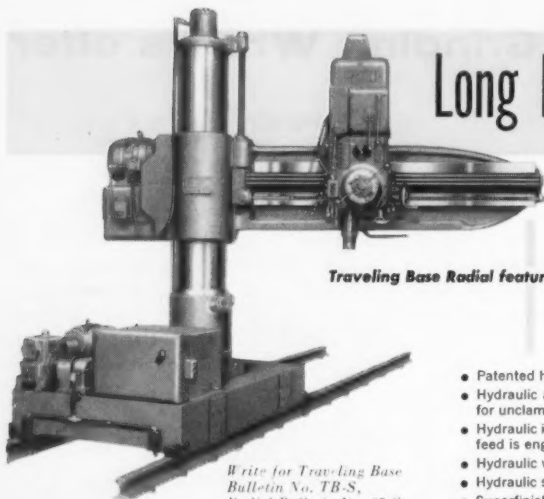
*Here's another reason
it pays to get a proposal
from Fosdick*

No Need to Move This 13-Ton Work Piece!

Work stays put, throughout entire drilling operation. The Fosdick Traveling Base Radial does all the moving. With its 8' arm and 35' track, it easily reaches every part of the heavy work piece—a 72" x 16' table for a Rockford Hy-draulic Planer.

The Fosdick Radial enables operator to drill hundreds of holes in one work setting. Arm can be rotated on column to reach smaller-work rush jobs on other end or other side of track, without disturbing heavy work set-up. Track clamps and hydraulic column clamp prevent side movement of column, assure accuracy and speed of drilling.

If your drilling work includes heavy pieces like the planer table shown, you can cut excessive handling time to a bare minimum with a Fosdick Traveling Base Radial. When you need drilling equipment, always be sure to get a proposal from Fosdick.



Traveling Base Radial features

*Write for Traveling Base
Bulletin No. TB-S,
Radial Bulletin No. 37-S.*

Long Reach of Fosdick

Traveling base traverses by push buttons conveniently located on head.

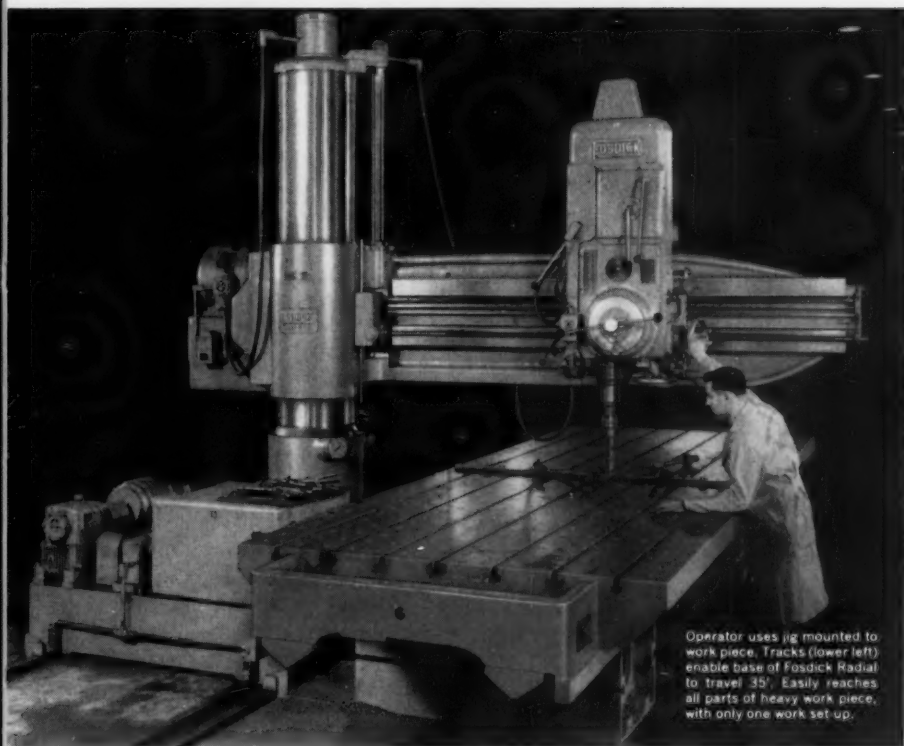
Traverse buttons also clamp and un-clamp base to rails, automatically.

Hydraulic rail clamps compensate for rail irregularities.

Interlock prevents arm from swinging while base is traversing. Base is heavy cast iron, honeycombed for rigidity and stable operation.

- Patented hydraulic arm and column clamps.
- Hydraulic arm clamp interlocked with single-lever control for unclamping and raising and lowering arm.
- Hydraulic interlock clamps head and column when feed is engaged.
- Hydraulic variable rapid traverse to head.
- Hydraulic safety nut.
- Superfinished column.

For more data circle 279 on Reader Service Card



Operator uses jig mounted to work piece. Tracks (lower left) enable base of Fosdick Radial to travel 35'. Easily reaches all parts of heavy work piece, with only one work set up.

Traveling Base Radial Cuts Handling Time

"Savings run up to 50% on jobs where handling time is a large part of total time. Fosdick performance has been excellent!"

says K. M. Allen, Executive Vice President
Rockford Machine Tool Company, Rockford, Ill.

Need Drilling Equipment? Get a Proposal from Fosdick!



Radial Drills



Jig Borers



Sensitive and Upright Drills



Sensitive Radial Drills



Automatic Positioning Machines

FOSDICK

THE FOSDICK MACHINE TOOL CO., CINCINNATI 23, OHIO

For more data circle 280 on Reader Service Card

March, 1955

MODERN MACHINE SHOP 81

FROM



1. 4-PURPOSE PRECISION PANTOGRAPH

The "*Panto-Miller*"

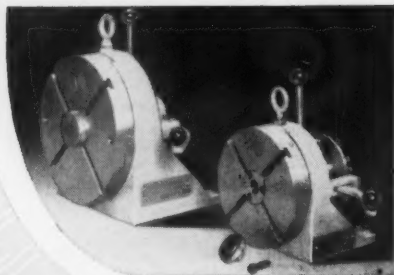
- Engraves
- Profiles
- Die Cuts
- Mills

A sturdy, production tool for 2-dimensional cutting in steel, cast iron, non-ferrous metals and plastics.

Pantograph reductions from 1:1 to 1:40. Spindle speeds infinitely variable from 1,200 to 11,500 RPM without belt changing.

Extreme accuracy and freedom of motion. Write for "*Panto-Miller*" details.

JOHNSON & BASSETT, INC. *Production Tool Div.*
BOX 1251, WORCESTER, MASSACHUSETTS, U. S. A.

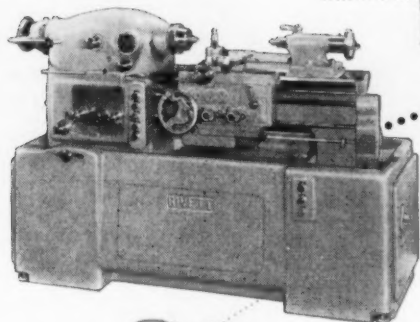


2. RAPID, ACCURATE JIG POSITIONING

This indexing trunnion, with station selector, accurately holds and locates either jig or work. SIMPLIFIES JIGS. REDUCES SET-UP TIME.

Ask for "TRUNNION" information

HAVE YOU LOOKED AT NEW LATHES LATELY?



**New lathes may not
be the whole answer
to lower costs—but
they will help!**

Study the features of new lathes being offered today, and you can learn how to make savings in toolroom and production.

Rivett offers two
lathes for one!

This is particularly true if you look at the Rivett Model 1020S Precision Toolroom Lathe. It features sensitivity for turning tolerances within .0004"; and heavy biting ruggedness for a 1/4" cut at .020" feed in cold rolled steel. Here is an instrument and engine lathe combined to handle any work within its 12 1/2" swing and 20" centers.

26 Features Distinguish
Rivett 1020S

RIVETT

LATHE AND GRINDER, INC.

Dept. MMR-3, Brighton 35, Boston, Mass.

For more data circle 282 on Reader Service Card

Write for free catalog

Catalog 1020B shows you what a Rivett can do in your shop.



HARDINGE
ELMIRA, N.Y.

High Speed Precision **MILLING MACHINES**



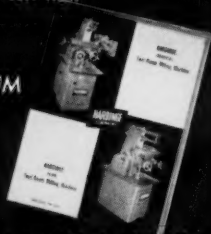
*The **RIGHT** Size For Work
Too Small for Heavy Duty Millers.*

Advantages

- Saves Production Time
- Higher Speeds
- Lower Power Consumption
- Less Investment
- Saves Floor Space

$1\frac{1}{16}$ " Cutter Spindle Capacity
with 5C Round Hardinge Collet
Eight Spindle Speeds —
110 to 1850 R.P.M.

Write for
Bulletin TM-UM



Model UM Universal Spiral Miller
Model TM Universal Plain Miller

HARDINGE BROTHERS, INC., ELMIRA, N. Y.

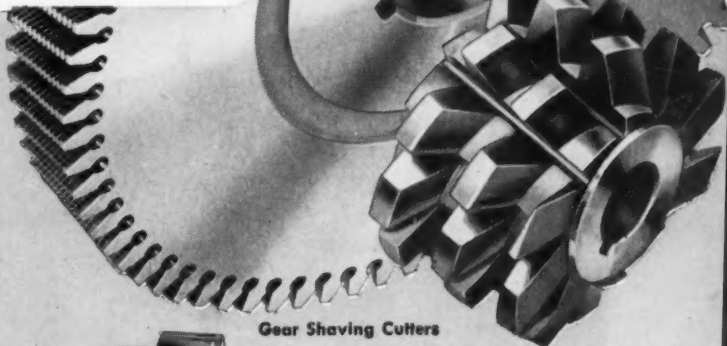
For more data circle 283 on Reader Service Card

Whatever kind of gears you make...
Whatever way you make them

National Tool Co.

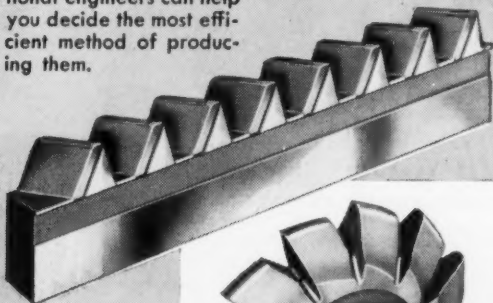
can supply the right type cutting tool
because we make *all* types

National Tool Co., with 50 years experience in the manufacture of special cutting tools, makes all varieties of gear cutting tools for all types of spur, helical and worm gears—as well as for sprockets and splines. Whatever your gear requirements—large or small—National engineers can help you decide the most efficient method of producing them.

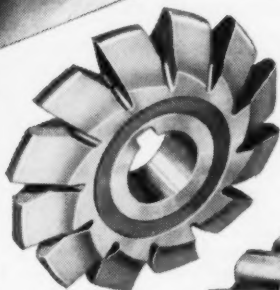


Gear Shaving Cutters

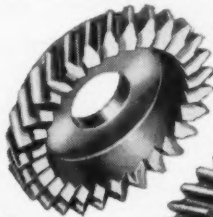
Hobs



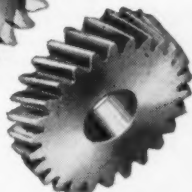
Rack Type Gear Shaper Cutters



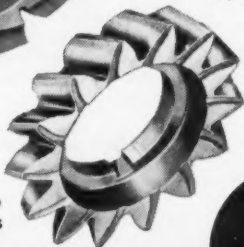
Involute
Gear Cutters



Gear Shaper
Cutters



Master Gears



Herringbone
Gear Cutters

Representatives in major industrial centers

1905 - 1955
Our 50 Years
National
TOOL CO.
Cleveland 2, Ohio

**TOOL ROOM OR PRODUCTION—
SPEEDS FOR CARBIDE TOOLS—
MEDIUM SIZE CAPACITY—**



With **FEATURES AND RANGE
NORMALLY FOUND IN LARGER LATHES**

Usually only in larger, more costly machines do you find the combination of speeds, swing, power, feeds and threads that are standard equipment on Rockford Economy Lathes. These features make it possible to machine a wider range of work with fewer non-productive hours than is possible with many machines in its class.

Medium-sized and economy-priced, it's built to handle any job that can be turned or threaded within 16-1/2" or 18-1/2" swing, and 30" to 102" center distance. 3100 lbs. of weight, 6' bed and zero precision bearings furnish the rigidity and precision for turning out tool room accuracy.

Ask a Rockford Machine Tool Co. representative to give you full details on these machines, or write direct for our new bulletin No. 900A.

**MEDIUM-SIZED
ECONOMY-PRICED**

ROCKFORD ECONOMY LATHES—16" and 18"

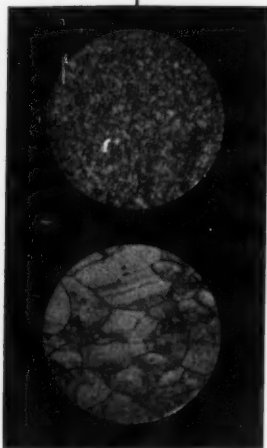
**ROCKFORD MACHINE TOOL CO.
2500 Kishwaukee Street, Rockford, Illinois**

For more data circle 285 on Reader Service Card

DURAFLEX . . .

a NEW fine-grain phosphor bronze with 30% GREATER ENDURANCE LIMIT

FINE-GRAIN STRUCTURE IS THE MAIN REASON . . .



Micrographs (75x magnification) tell the inside story. Top, note the fine-grain structure of DURAFLEX. Compare it with the grain structure of ordinary phosphor bronze, bottom.

DURAFLEX* is a new, fine-grain phosphor bronze developed and sold only by Anaconda. Comparative fatigue tests show that the endurance limit of DURAFLEX is approximately 30% higher than for ordinary phosphor bronzes. In surface appearance, surface smoothness and resistance to corrosion, it is equal to, or better than, other phosphor bronzes. Further, its formability is increased with no sacrifice in yield strength. DURAFLEX is a *premium* phosphor bronze in every way except cost; there's *no increase in price*.

If you're now using a hard-temper phosphor bronze, chances are that you can do the same forming in extra-hard temper DURAFLEX. If you're looking for longer life in the parts you form, we'll be glad to send you a free sample of DURAFLEX. Try it, test it, and you will agree that it's superior.

5576-C

*Trade-Mark

DURAFLEX fine-grain phosphor bronze

an **ANACONDA**® product
MADE BY THE AMERICAN BRASS COMPANY

Try a FREE SAMPLE of

DURAFLEX



Sheet . . . up to 0.062" thick

Wire . . . up to 3/16" diameter (approx.)

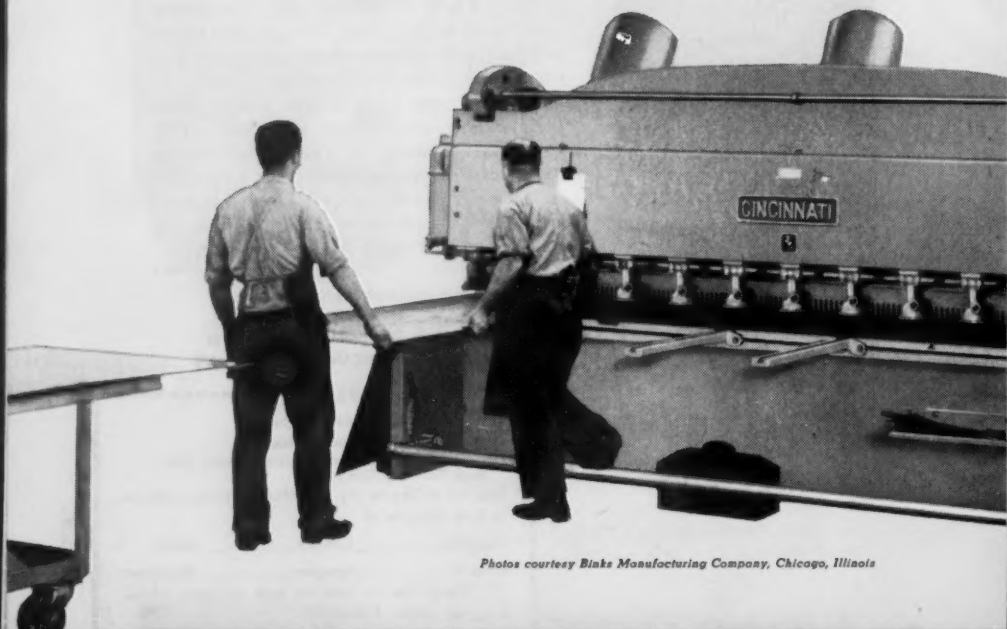
FREE SAMPLE	
The American Brass Company, Waterbury 20, Connecticut (In Canada: Anaconda American Brass, Ltd., New Toronto, Ont.)	
Yes, we'd like to try DURAFLEX. Please send us a free sample of	
sheet in _____ temper,	_____ thick,
wire in _____ temper,	_____ diameter.
<input type="checkbox"/> We'd like to talk to one of your metal- lurgists about DURAFLEX.	
NAME	
COMPANY	
STREET	
CITY	ZONE.....STATE.....

For more data circle 286 on Reader Service Card

accurate **CINCINNATI**
shearing from **20**
GAUGE
SHEETS to **5/16"**
PLATE

...with **ONE**
knife setting

... **SPEEDS PRODUCTION**



Photos courtesy Blaks Manufacturing Company, Chicago, Illinois



THE CINCINNATI SHAPER CO.

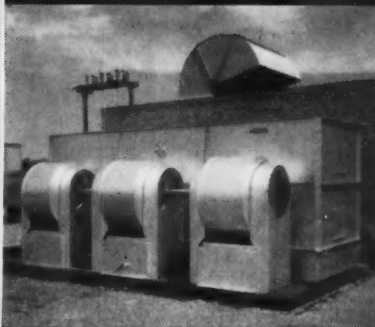
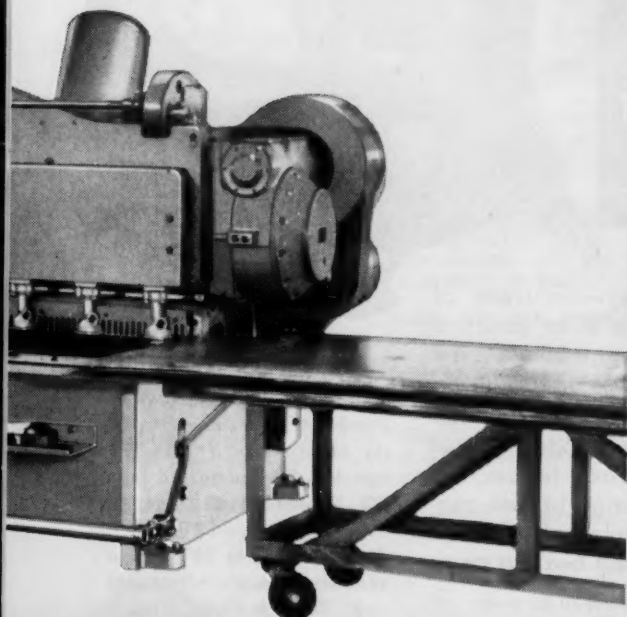
CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES

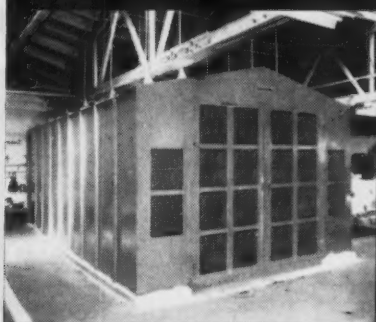
Here 20 gauge to $\frac{1}{4}$ " plate is sheared with no change of knife clearance—a time saving and production increasing feature.

The Binks Manufacturing Company say this Cincinnati Shear is a very accurate machine and a most profitable investment.

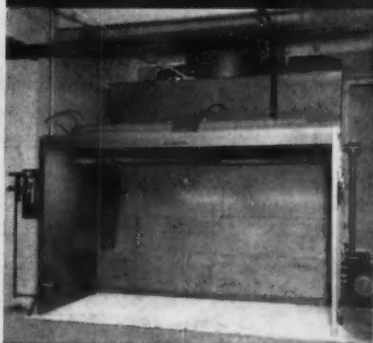
Write for Catalog S-6.



Water cooling tower



Dry auto spray booth



Water wash spray booth

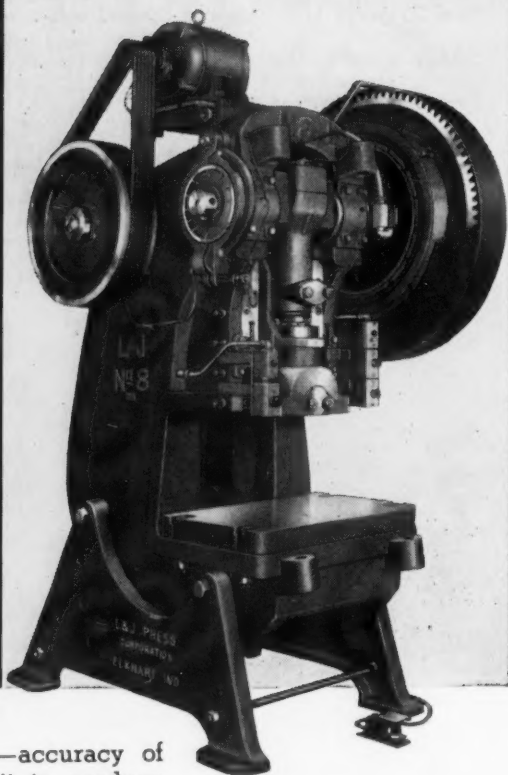
NEW



NO. 8

PRESS

FOR MORE
PRODUCTION AT
LOWER COSTS



The rigidity—versatility—accuracy of this new press enable it to produce more at lower costs. It provides a new concept of efficient press operation.

The air clutch is standard on both the geared and non-geared models. Other features include alloy iron frames, adjustable gibs, air releasing brakes, rugged ram screw with replaceable bronze seat, recessed crankshaft bearing caps.

Write for Catalog L-12. Describes all 21 geared and non-geared O.B.I. Presses, 8 to 90 ton capacities. Also, 20 to 50 ton Straight Side Presses.

Specifications

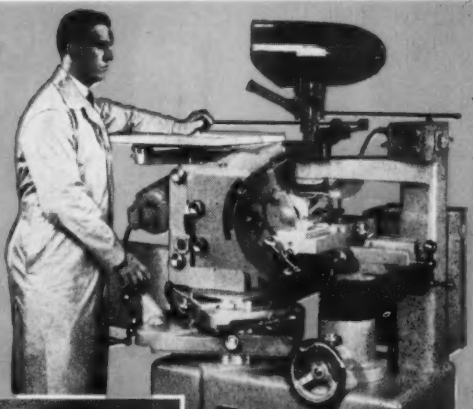
Capacity—90 tons. Standard Stroke—4". Maximum Stroke (to order)—8". Strokes per minute—40 (non-geared type 70). Throat Depth center of ram to frame—12½". Die Space—16½" to 24" (bed to ram, stroke down, adjustment up). Bolster Plate Area—38" x 24".

L & J Press Corporation, 1624 Sterling Ave., Elkhart, Ind.

For more data circle 289 on Reader Service Card

Grind High Precision
Profiles Directly
from the Drawing

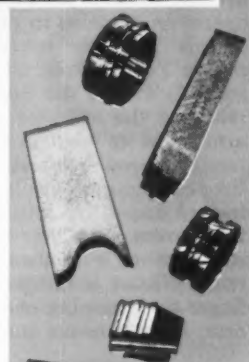
with
**SHEFFIELD'S
MICRO-FORM
GRINDER**



FEATURES

- Grinds both flat and circular profiles
- No restrictions on profile intricacy
- No templates needed
- Perfect toolroom accuracy
- Saves up to 75% on profile work
- Final accuracy checked while work is still on the grinder
- Accuracy not affected by wheel wear
- No special wheel dressing required as wheel can be set at any angle—fewer wheels are needed
- Diamond impregnated wheels used in grinding carbides last longer—no waste as no special dressing is required
- Multiple work parts ground simultaneously
- Grinds any material including carbides
- Controlled by 50:1 pantograph and 30 power scope and viewing screen

The Sheffield Corporation
Dayton 1, Ohio, U.S.A.



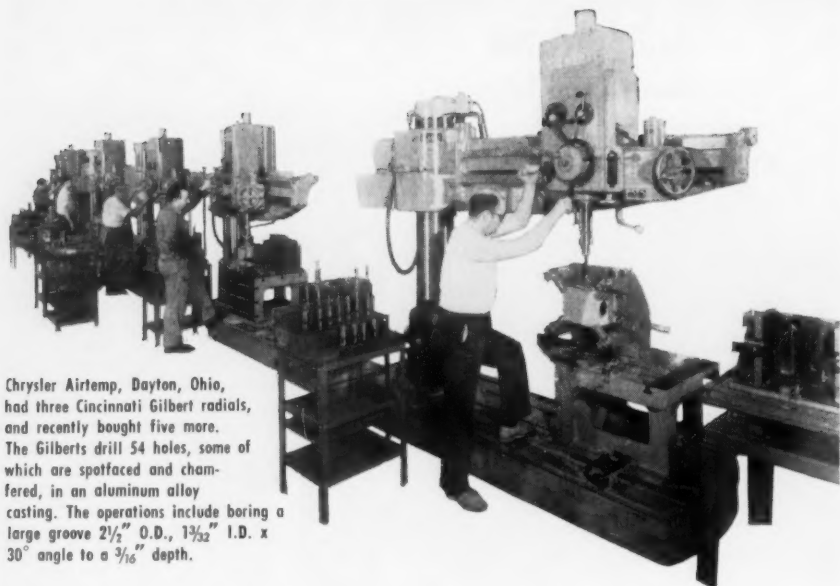
For full details and specifications ask your Sheffield representative for Bulletin MFG-122-51 or write us direct.



SHEFFIELD

7124

For more data circle 290 on Reader Service Card



Chrysler Airtemp, Dayton, Ohio, had three Cincinnati Gilbert radials, and recently bought five more. The Gilberts drill 54 holes, some of which are spotfaced and chamfered, in an aluminum alloy casting. The operations include boring a large groove $2\frac{1}{2}$ " O.D., $1\frac{1}{2}$ " I.D. x 30° angle to a $\frac{3}{16}$ " depth.

They bought five more...

because Gilberts produce more. Ease of operation explains in part why Gilbert radials produce more in so many plants. For example, all speed and feed controls are on the head, within easy reach of the operator even when the arm is in its highest position. Direct reading speed and feed plates eliminate time-consuming calculations. You get instant finger-tip shifting of speed and feed levers. The four-lever feed turnstile puts one lever always within handy reach. Other easy-operating features: finger-tip clamping of the head to the arm; instantaneous one-lever arm con-

trol (unclamps, raises, or lowers the arm in one easy motion); effortless head traversing due to balanced, ball-bearing mounting; adjustable electric light at the spindle.

Gilbert radials have 9 or 11-inch columns; 12 spindle speeds in each of 3 ranges; 6 power feeds, .003" to .020". Tap leads are available. *Delivery in 30 days or less.* As the Chrysler Airtemp story shows, "those who buy Gilbert buy Gilbert again." Get full data on the Gilbert's many advantages.

Write for Bulletin 349 today. ▼

GILBERT

RADIALS • BORING MILLS • ACCESSORIES

THE CINCINNATI GILBERT MACHINE TOOL CO., 3366 BEEKMAN ST. • CINCINNATI 23, OHIO

For more data circle 291 on Reader Service Card



POP'S School of Filing



For years Nicholson's "File Philosophy" has been a master key to *lower filing costs, higher working efficiencies and increased mechanical efficiency.*

Now this most widely used manual on files and filing has been revised-and-polished with up-to-date changes and more pages—including an added chapter on Rotary Files and Burs of special interest to Industry.

With today's mutiplicity of metals and alloys, accuracy and speed in production and assembly-line operations make the

use of *The right file for the job* increasingly important.

Nicholson's wide range of job-tested Special Purpose files makes this book especially useful to production engineers and shop foremen, as well as to management and purchasing heads.

Send for This New Edition of "File Philosophy"

Make request individually or on behalf of your organization. If you need more than a single copy, state number desired. Use letter, post card or this coupon.

NICHOLSON FILE CO., 48 Acorn St., Providence 1, R. I.

(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario)



Send me a copy of the new edition of Nicholson's "File Philosophy"

Name _____

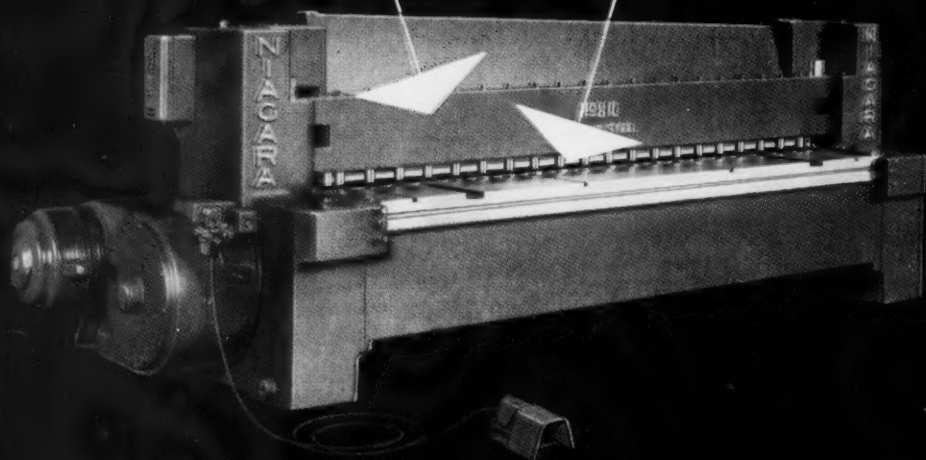
Title _____

Company _____

Address _____

For more data circle 292 on Reader Service Card

SELF-COMPENSATING HOLDDOWN



*America's most complete line of presses, shears,
machines and tools for plate and sheet metal work*

a BIG FACTOR in the superiority of Niagara Shears

"STRAIGHT-EDGE" CUTTING ACCURACY

Positive, power actuation grips work securely for maximum cutting accuracy.

LOW IMPACT AVERTS DAMAGE AND INACCURACY

Individual pressure feet contact work with low impact, thus safeguarding both the material and bed against damage, as well as reducing noise level. No hammer-blows to mar work. No peening of bed with resulting distortion of knife seat.

SIMPLIFIED, LOW UPKEEP DESIGN

Simplicity of design and construction, involving a minimum number of parts, assures negligible servicing. With less to go wrong, there is less to repair and replace.

HOLDS WORK FLAT AND STATIONARY

Multiple pressure feet on 6" centers, applying uniform pressure, hold work flat and tight against bed to assure utmost shearing accuracy. No rippling of sheet between feet as cut progresses. Firm grip on short pieces.

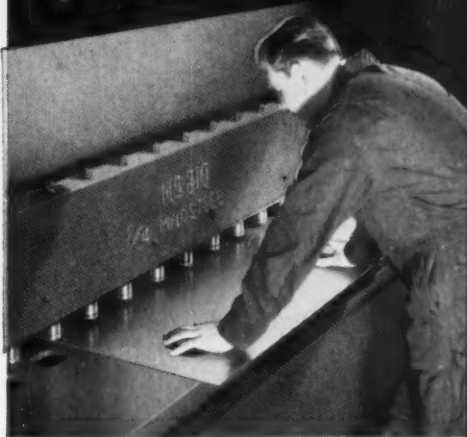
HANDLES STOCK OF VARYING THICKNESS

Individual feet are self-compensating, requiring no adjustment for cutting stock of different thicknesses
... even at the same time.

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

DISTRICT OFFICES: Buffalo • Cleveland • Detroit
New York • Philadelphia

Dealers in principal U. S. cities and major foreign countries



In a power squaring shear, no single feature nor component can be fully responsible for accuracy, speed and economy. They result from a combination of features such as the self-compensating holddown; rigid, fully closed box section construction of bed and crosshead; low slope of upper knife; ample and accurately held cross-head guides; multiple point sleeve clutch — the very features that have established the marked superiority of Niagara's Underdrive Series.

For the whole story, straightforwardly presented, on America's most complete line of underdrive power squaring shears, with capacities from shim stock to 1 in. thick mild steel (lengths 3 to 20 ft.), request *Niagara Bulletin 69*. Write today.



NIAGARA

UNDERDRIVE SQUARING SHEARS



**"Here's why GISHOLT insists upon
the HEAVIEST CASTINGS!"**

Look at them... castings for the heaviest saddle type turret lathes in the business! Look at all the angles:

First, note how the headstock is cast integrally with the bed for perfect spindle alignment... how cross supports give the most solid base for carriages, tools and slides... how extra-heavy webbing gives the headstock the ruggedness to support powerful gear train members.

Remember, too, that cast iron absorbs vibration. The heavier the better! And Gisholt controls the quality of the finest nickel semi-steel in its own foundry.



The Gisholt 5L Saddle Type Turret Lathe has a net weight of 22,500 lb. without equipment.

What does it mean to you? You can load up your Gisholts with carbides and really turn out the chips! You've got the strength, the rigidity and the freedom from vibration to take all the speed you can get from today's carbides—with the heaviest feeds—and still have the safety margin to take care of tomorrow's tool bit developments.

GISHOLT
MACHINE COMPANY
Madison 10, Wisconsin

THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.



TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

For more data circle 295 on Reader Service Card

TAPS & GAGES *by Card*

Now, Card brings you a precision line of gages along with renowned Card taps. You can specify and use both with complete confidence, knowing that whatever the job demands, you'll get top performance. We assure you that the new line of gages guarantees the same quality that has made Card taps famous over the past 81 years.

Contact your local Card Distributor for prompt deliveries and helpful service.



S. W. CARD MANUFACTURING CO.

MANSFIELD - MASSACHUSETTS

Division of Union Twist Drill Co. TAPS - DIES - SCREW PLATES - GAGES


For more data circle 296 on Reader Service Card


Why you get top savings with The "CROWN JEWELS"





Buying diamond wheels calls for the same trust in the supplier as buying gem diamonds. Right there is where Norton's long leadership in diamond wheel development and manufacture is your best possible safeguard. Only Norton offers you such long diamond wheel experience to help you produce more at lower cost.


Check these reasons why Norton diamond wheels are the recognized "Crown Jewels" of the entire field:

 Norton was first to introduce the three major diamond wheel bond types — resinoid, metal and vitrified.

 The sizing, grading and laboratory checking of diamonds used in Norton diamond wheels is done in Norton's own plant.

 Norton duplicates specifications for each wheel type and size with utmost accuracy for uniform top performance.

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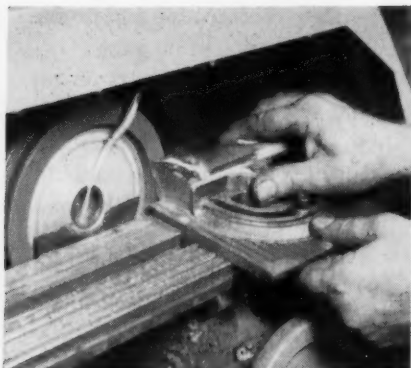
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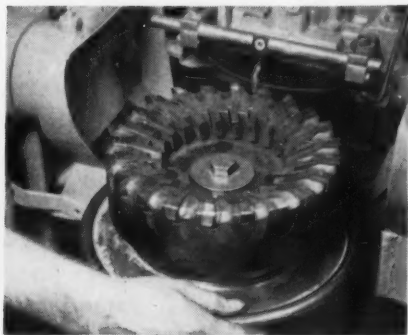
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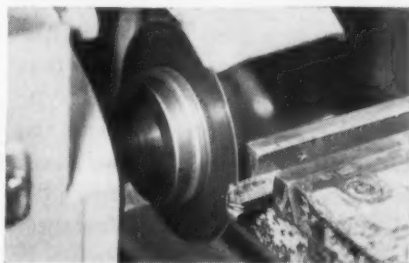


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Over the Editor's Desk

PROGRESS DEMANDS CHANGES

This issue is the culmination of many months of careful study, thoughtful planning and painstaking effort. Through questionnaires and surveys and personal interviews, you've told us that this is the kind of magazine you would like to receive. We have been guided by your suggestions in the preparation of this new format.

Your suggestions have prompted the use of the new page layout that invites reading, the distinctive type faces that are designed to make the reading of headlines and copy easier and more pleasant, the improved department headings that instantly signal exciting new developments in the metalworking field. And for your convenience in obtaining additional information and data, you'll find a new Reader Service Card that is keyed to both advertisements and editorial items.

We would call attention once again to the fact that the real price

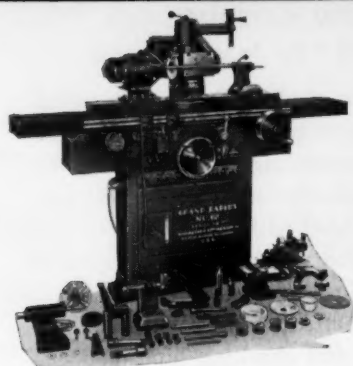
you pay for receiving copies of **MODERN MACHINE SHOP** is the time you spend reading it. Frankly, we would like to have you spend more time in reading each issue and that is why we are sparing neither effort nor expense to make your reading as enjoyable and profitable as possible.

Without the loyal support of our many advertisers, the improvements in this issue, even the publishing of this magazine, would not be possible. Therefore, when you are in the market for some new machine or tool or material, we hope that you will make your selection from products advertised on these pages.

To produce the issue now in your hands—an issue which sets the pace and pattern for future issues—teamwork of highest caliber was required. At work behind the scenes has been a team consisting of a brilliant magazine design consultant, the art and editorial staff, the typesetters, the printers, the photoengravers, the ink and paper suppliers, and the publisher. This team has worked with one thought in mind—to make it easier for you—the busy production executive—to find the information you want and which will help you do your job just a little bit better. The team is mighty proud of this issue. They hope you will let them know what you think of it. Why not send them your comments today?

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VOL. 27, NO. 10

MARCH, 1955

**BLACK LIGHT—NEW MACHINE SHOP
TROUBLE SHOOTER • By James Joseph**

Various applications of black light in the metal-working industry as a trouble-shooting tool are discussed in this interesting report. Among the uses of black light illustrated in this article are: inspecting parts coated with a transparent fungicidal varnish to ensure complete coverage; inspecting piping, including lines to machinery; close inspection of small aircraft parts; general illumination of inspection booths; and checking luminous dials for lettering defects. Page 105.

**ESSENTIALS IN GOOD GAGE DESIGN,
PART III • By C. W. Kennedy**

With this installment, the author concludes his discussion of certain phases of gage practice and construction. (We suggest that the reader save this installment along with the two preceding installments for future reference in solving gage design and practice problems.) Page 110.

**CHAIN DRIVES FOR METALWORKING
EQUIPMENT • By John E. Hyler**

The advantages of both roller and silent chain drives in ensuring positive, non-slip and smooth power transmission in gear hobbing machines, shapers, nut making machines, grinders, automatic screw machines, lathes, presses, and other machine tools are explained in this well-illustrated article. Page 116.



**FEATURES
IN THIS
ISSUE**

**CAST-IN DRILL BUSHINGS REDUCE
TOOLING TIME • By Gilbert C. Close**

Time savings effected in producing trim-and-drill fixtures at Northrop Aircraft using an epoxy resin for casting bushings in place are pointed out by the author. Page 128.

**HOW GOOD A BOSS ARE YOU?
By Alfred M. Cooper**

In this article, the author develops a practical 11-point supervisory check sheet—based on his own experience in metalworking plants—by which foremen and office managers may evaluate roughly the quality of their own supervision. Page 132.

★ ★ ★ ★ ★

Features In Next Issue

**SHIFTING ELEMENTS FOR MACHINERY,
PART I • By Fred Rogers**

The first installment of this two-part article will discuss the various types of shifting rollers, shoes, yokes and rings, their design, means of retension, dimensional tolerances, and the different materials and heat treatments used for them.

**HOW TO MACHINE STAINLESS STEELS
WITH BOX TOOLS • By G. J. Stevens**

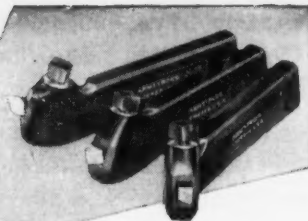
The author will discuss briefly some of the best box-tool setup practices for turning stainless steels and illustrate how certain problems are solved.

**FEATURES
IN THIS
ISSUE**





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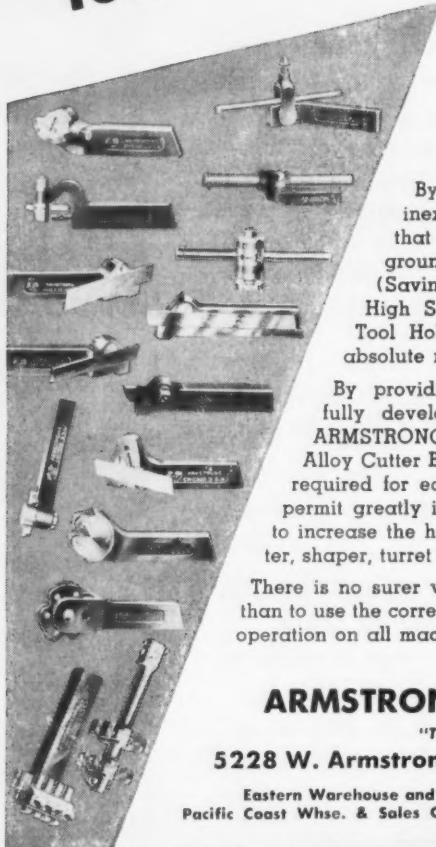
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Black Light— New Machine Shop Trouble-Shooter

Various applications of black light in the metal-working industry as a trouble-shooting tool are discussed in this report.

By JAMES JOSEPH

PARADOXICALLY, black light is currently illuminating some sore spots in machine shops coast-to-coast. Black light, of course, is ultraviolet light under whose rays everything from lathe lubricants to certain metal finishes fluoresce with characteristic — and telltale — coloration.

Admittedly, black light isn't "new." It is new, however, in its special—and important—application to the nation's metalworking industry. The following paragraphs describe a few practical examples:

(1) Using black light, American Microphone Company has drastically cut rejects on its finishing lines. The company was turning out small parts for the armed forces, the parts being finished with an anti-fungal varnish. The varnish, however, was "clear" and "misses" in the coating were almost impossible to



Inspecting piping, including lines to machinery, with black light.

detect. Management, remembering that certain substances fluoresce under ultraviolet light, used a fluorescent additive in the varnish. Inspected under ultraviolet ("black") lamps, the finish fluoresced brilliantly, instantly revealing "misses."

(2) A California metalworking firm lends valuable dies (some unpatented) to various subcontractors. The firm wanted to make sure that not only did it get the dies back, but that they hadn't been switched. So the metalworker coded each die and fixture with invisible fluorescent ink. When items are returned from a subcontractor, they're automatically inspected under a bank of black lights. Fully five per cent of dies returned were found to belong to other companies.

"Many leaks . . . are now caught while they're small . . ."

(3) A manufacturer of oil-filled transformers now checks each transformer for leaks prior to shipment. Formerly, minute leaks might exist, yet were overlooked. Now the manufacturer (a San Francisco concern) fills each transformer with water, adds a fluorescing powder, and a rust inhibitor (to protect the metal from water damage), and then inspects exterior seams under black light. The results are fewer customer rejects. Under black light, even the minutest of cracks glowed brilliantly and revealed themselves.

(4) Maintenance men at another metalworking plant run periodic

checks on all air, lubricant and water lines. Into liquid lines they introduce water or oil-soluble fluorescent powder (as little as 1/1000th of 1 per cent per volume). Then, sweeping joints, seams and valves with an ultraviolet lamp held within 3 to 6 inches of the fixture, they check for leaks. Many leaks which previously escaped detection until full-blown are now caught while they're small and easily repaired. In the case of air lines, fluorescent powder is added to the air reservoir. Again, piping is checked with black light. Air leaks show up brilliantly. For best results—and greatest fluorescence—inspections are made in the dark or with minimum interference by other non-ultraviolet light sources.

(5) **BLACK LIGHT** is also a "detective." One of its long-time uses is tool marking, especially when theft is suspected. Tools are coded with invisible fluorescent inks or paints. Investigators found more than a dozen expensive hand tools in one employee's home workshop simply by inspecting each tool under a portable ultraviolet lamp.

(6) Probably the most unique of recent black light applications involves a west coast aircraft company. Aircraft inspectors, spot-checking machined parts from a subcontractor, were in the habit of rejecting an entire batch if enough proved below specifications. But inspectors suspected that the subcontractor was scattering rejects through other batches, hoping they'd get by. Now, every below-spec surface is painted with invisible ink. Suppose that a casting, sent out for machining, is rejected because of a



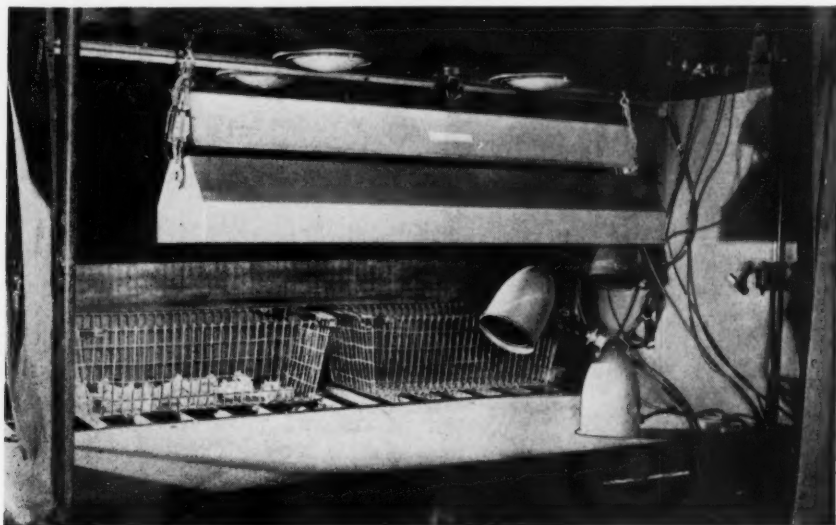
Ultraviolet lamp is used to inspect parts coated with a transparent fungicidal varnish to ensure complete coverage.

too-high shoulder. Before returning the rejected batch to the subcontractor, each casting's shoulder is painted with invisible, fluorescing inks. As batches of the same casting come to the aircraft manufacturer, each part passes beneath a black light. If the painted surface glows fluorescent it's indicative that it was not remachined, since the machining would have removed the invisible inks.

(7) A similar use involves one of several machine shops supplying small parts to a prime contractor. The company wanted some positive way to identify its own parts. "We don't like rejects, naturally," the plant manager told this reporter, "but when the rejected part isn't ours, we're really disturbed." "So now," he continued, "we fluorescent-

ink code every part leaving this shop. Rejects are passed under an ultraviolet light. Parts not showing the coded fluorescent marking are returned to the prime contractor—because they're not ours."

(8) And, of course, the best-known use of black light is in conjunction with fluorescent penetrant inspection. The process involves dipping or spraying castings and machined parts in water-soluble fluorescent penetrating oil, allowing the part to drain and then washing with water to remove excess oil. Dipped in "developer," the part is inspected for flaws under a black light (long wave ultraviolet). The developer draws to the surface of flaws what fluorescent oil has penetrated surface cracks and abrasions. Under black light, flaws show up read-



In this fluorescent penetrant inspection booth used at Lockheed Aircraft, conveyors bring parts to the inspection table. Note the over-

head black lights for general illumination and the smaller lamps for close-inspection operations.

**"It's possible to trouble trace
any machine piping circuit . . ."**

ily—far better than when using non-fluorescing penetrants.

Another type of fluorescent additive has become a trouble-shooter for a number of metalworkers. Added to cooling fluid and lube reservoirs, the fluorescent powder (or liquid) aids in tracing small leaks in present machine tool hydraulic systems.

One shop, trouble-shooting by black light, checks all machine piping twice yearly. The process is simple. Small amounts of fluorescent additive are mixed into machine wells and reservoirs. Then, using portable ultraviolet lamps (and

holding them 3 to 6 inches from the piping), maintenance men "circuit trace" for leaks.

No trouble-shooting device is perfect . . . and that includes black light. Used in inexperienced hands it can give false readings. This is because many materials found around the shop—including lubricants, detergents, soaps, and even some metals—are naturally fluorescent. Their response to black light may at first glance appear the same as that given off by various additives used specifically for trouble-tracing. Examples of this are sulfide wastes which appear bluish white under black light. But so do lubricating oils and greases, although some tend toward greenish. Pitches and tars fluoresce yellow. Optical bleaches such as found in most plant-used detergents and soaps will make white cloth fluoresce a brilliant bluish white.

So some study and comparison are needed. Certain machine tool lubricants naturally fluoresce bluish. In this case, you'd select a fluorescent additive of a different color. Or, it is quite possible that a blue additive could be used, since close inspection might reveal it to be a different shade or of greater brilliance than the lubricant.

MANY PLANT maintainers draw up "color" charts, pin-pointing colors as to source. For instance, one shade of blue may indicate one type of grease. Another lighter blue color may indicate another type of grease. It is possible, then, to trouble trace almost any machine tool's piping circuit using black light.

What is "black light"? It's noth-



Luminous dials used in planes, cars, radios, and so on, are checked under ultraviolet light for lettering defects.

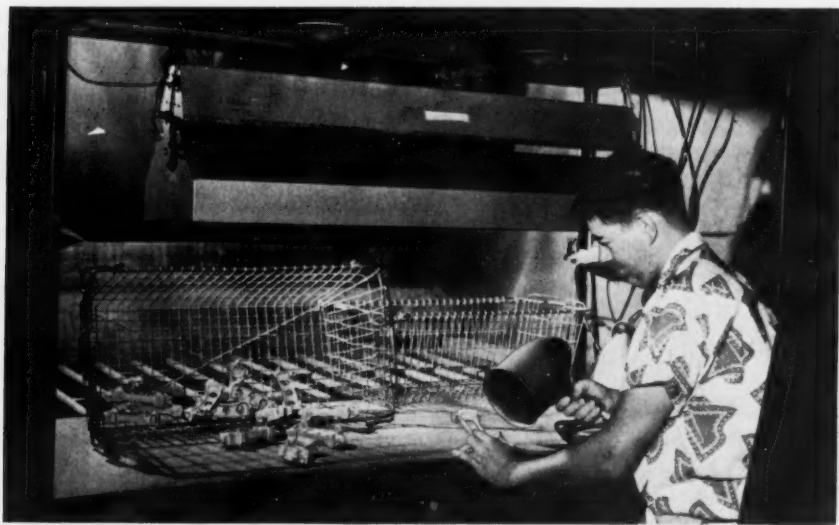
ing more than ultraviolet wave lengths, that portion of the spectrum below the visible. Technically, "black light" is classified as between 3200-4000 Angstrom units. Almost all commercial ultraviolet lamps are filtered to pass ultraviolet rays while holding back light in the visible spectrum. Most testing is done in a darkened room. A typical commercial "black light" uses a 6-watt ultraviolet-emitting fluorescent tube. An easily removable red-purple precision-made tubular filter (average thickness, 3-4 mm.) encloses the tube, eliminating all but 3 per cent of the visible blue light. Some units sell for as little as \$16.

Thus, "black light" has become—for a goodly number of metalworkers—an important tool of troubleshooting.

Machining and Gaging Films

THE Sheffield Corp., Dayton 1, Ohio, has announced the completion and release of two technical automatic sound slide films. "Machining the Unmachinable" is the story of a process for machining the hardest materials known to man by the utilization of ultrasonic energy with Sheffield's Cavitron. Running time for the slide film is 16 minutes. "New Horizons for Quality" pictures the application of Plunjet, the air gaging cartridge of a thousand uses, to machine control, multiple dimension inspection and numerous other applications. Running time is 14.5 minutes. Both films are of the educational type.

For more data circle 1 on Reader Service Card



Close inspection of small parts at Lockheed Aircraft. Two black lights are shown here—one overhead black light for general illumi-

nation and flaw detection, and the other light hand held, for closer inspection of workpieces.

Essentials In Good Gage Design

Part III

With this installment, the author concludes his discussion of certain phases of gage practice and construction.

By C. W. KENNEDY

IN the two previous installments certain phases of gage practice and construction were described. This series about gage fundamentals has been presented on the premise that the prevailing industrial tendency is to design and make a specific gage for the job, rather than rely on traditional gaging equipment, and that it is becoming increasingly necessary, consequently, for those who

will consider, select, help to design, buy or use special purpose gaging apparatus to have at least an appreciation of certain basic gaging principles.

The preceding articles included discussions of elementary conditions like friction, inertia, deflection and repetition, among other things, an intelligent cognizance of which guides the gage buyer or user toward better selection of gaging apparatus for particular measuring problems. In particular, the statement was made that in the old days gaging apparatus was designed to do the measuring itself well enough perhaps but the professional handling and correct positioning of the gage was left to the skill and experience of the user. The modern trend is to build means into the gage that make its correct use practically automatic in the hands of the untrained, unskilled worker.

When a gaging method is to be planned in connection with some

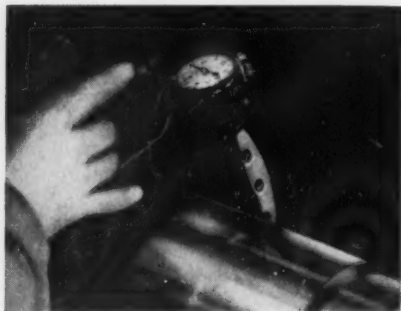


Fig. 19—This type of gage is designed to be brought to the work in such a manner that size reading is obtained almost instantly.

machining operation, oftentimes serious consideration should be given first to a decision as to whether the gage should be brought to the workpiece or whether it will be more efficient to bring the work to the gage. The clerk behind the oldtime yard goods counter offers a homely example of the philosophy implied. There was a time when he unfolded the cloth and awkwardly paced off the desired length with a yardstick. Then some bright person conceived the time-saving invention of a pair of round head, brass upholstery tacks, driven a yard apart into the top of the counter, against which the clerk deftly stretches the edge of the fabric and thus quickly and accurately measures the length of cloth milady ordered.

To bring the subject back to a more up-to-date level, Fig. 19 shows a gage which is designed to be brought up to the work in such a manner that the size reading is secured almost instantly. On the other hand, Fig. 20 depicts a gaging system where, rather obviously, a multiplicity of simultaneous checks could be obtained only by conveying the work to the gaging apparatus.

WHETHER THE WORKPIECE is brought to the gage or vice versa, the next situation to be analyzed in connection with the design of a special purpose gage is the matter of the reference surface. At this point the designer needs the help of those who are buying the gage or planning its use. Basically, gaging should be thought of as measuring *from* some point, line, surface or location to another. The ordinary everyday use of a hook rule, as shown in Fig. 21,

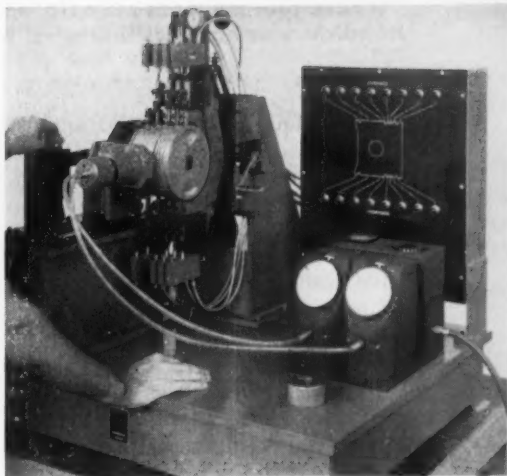


Fig. 20—This illustration depicts a gaging system where a multiplicity of simultaneous checks could be obtained only by conveying the workpiece to the gaging apparatus.

involves this "from-to" principle.

Getting the correct measurement with the method shown in Fig. 21 depends on the accuracy and condition of the hook rule, plus the user's ability to apply and read it. The result also depends on the condition

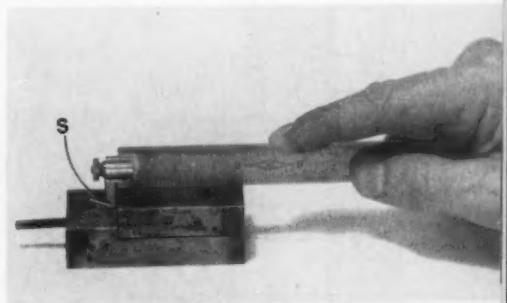


Fig. 21—The ordinary every-day use of a hook rule, as shown in this illustration, involves the "from-to" principle.

"Where tolerances . . . are close . . . the designer gives consideration to holders or carriers intended to facilitate locating the piece . . ."

of the surface (*S* in Fig. 21) against which the hook is lodged. If this surface is irregular, rough or burred, repetitive or correct determination of the dimension is liable to be difficult if not impossible. Most of us have seen shop inspectors scouring off edge burrs with emery cloth in order to come up with a substantial measurement.

Figure 22 illustrates a gage designed to determine whether the hole in a bushing inserted in a casting is square with the face of the casting. In this situation, which aptly illustrates the importance of attention to reference surfaces, agreement had to be reached concerning the machining operations to be completed before the bushing was assembled, and which surfaces the gage designer could rely on for reference to obtain the desired check.

Where tolerances on a multi-dimensional piece are close and where

measurements are sometimes awkward to obtain in a multi-purpose single-action gage because of the size or shape of the piece, the designer gives consideration to holders or carriers intended to facilitate locating the piece into measuring position. A positioning carrier device is shown in the circle on the gage in Fig. 23. For very small parts a holder can be provided which, working on the carrier, moves forward and backward between the measuring contacts.

THE SKETCH in Fig. 24 is intended to further illustrate positioning devices incorporated in a multi-check gage. In this case a rather intricate shaped workpiece had to be carefully located by supporting blocks and guide contacts (indicated as *A*, *B*, *C* and *D* in the sketch). Another reason for special attention to location was that reference surfaces had to be carefully selected because the

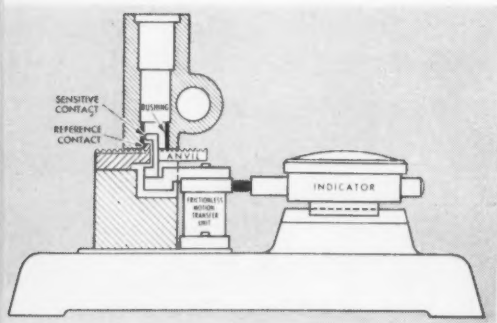


Fig. 22—This illustration shows a gage for determining if the hole in a bushing inserted in a casting is square with the casting face.

workpiece was to be checked before all machining operations on it had been completed.

This same multiple gaging problem points to another condition that the designer tries to keep constantly in mind. There are five characteris-

tics to be checked simultaneously and every reasonable facility should be offered so that accurate readings can be obtained in practically a single glance. The gage was designed to stand upright so that the dials faced the operator at eye level and then pains were taken to place the indicators close together. Such precautions tend to reduce the error from parallax in reading instruments.

Speaking of concentrating visual attention onto instruments, the psychologists, from their studies, have found that round and window dials are easiest to read. Figure 25 shows graphically the results of their experiments*. Shown are five dials—vertical, horizontal, semi-circular, round and window—all with the same numbers, the same pointers and the same distance between graduations. Allowing 0.12 seconds' exposure to view each one, the window

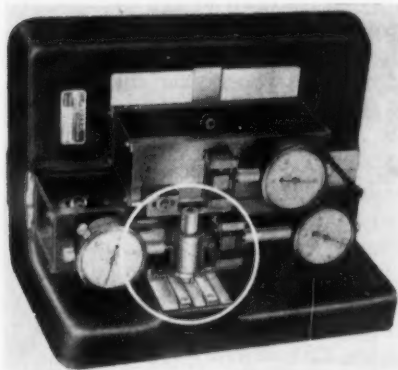


Fig. 23—A positioning carrier device is shown in the circle on the gage in this illustration.

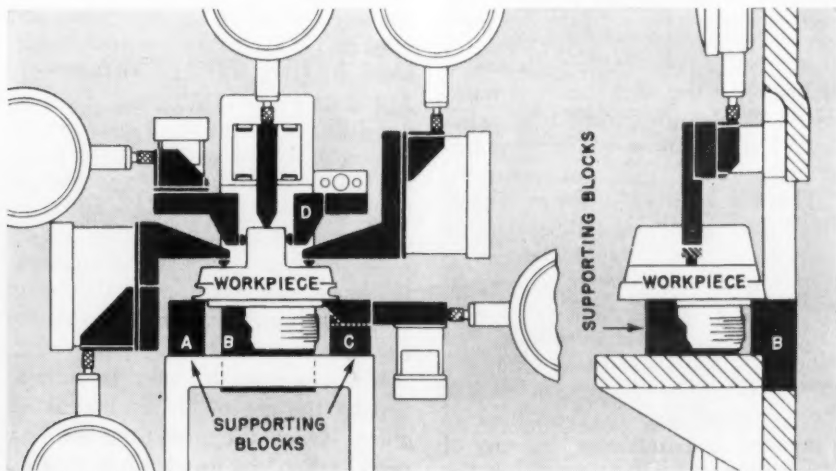


Fig. 24—This sketch shows positioning devices incorporated in a multi-check type of gaging device.

"In internal grinding or lapping operations . . . the dimension can be measured while the work is still in the chuck . . ."

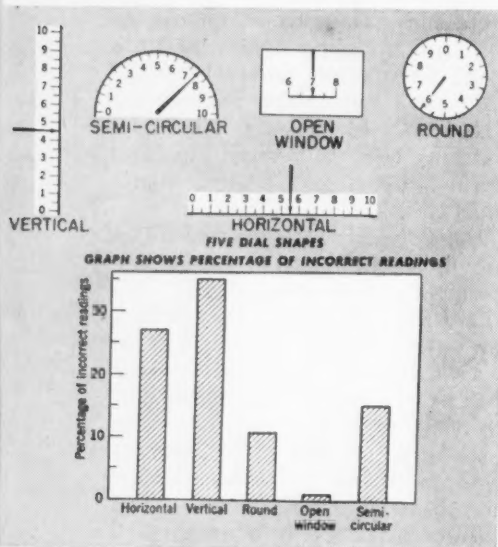


Fig. 25—This sketch shows graphically the results of experiments that indicate that round and window dials are easiest to read.

dial won the test with the least number of errors; the round dial came second, and human vision responded least accurately to vertical dials.

There are indicating gage applications where fullest advantage can be taken of the psychologists' findings by marking, shading in or masking the dial face or crystal of an indicator, combining, in effect, two winners of the observation trials described above by putting a window over a round dial. Figure 26 shows a masked dial indicator, by way of illustration, which exposes for the operator only the tolerance spread on the dial.

Because of several favorable properties characteristic of the air gage itself, modern air gaging systems can be turned to in many measurement situations to cancel out some of the problems of transfer, deflection, friction and the like which were discussed in the two preceding installments of this series. For one single example, an air gage plug can be connected to the gage itself by extension tubing so that the actual measuring can be done at any convenient position or location — low, high or at an angle — yet the dial reading can be flashed back squarely in front of the operator's eyes. Figure 27 illustrates this effect of measuring by means of an air gage extension tube. In internal grinding or lapping operations, as a further example, the dimension can be measured while the work is still in the chuck but the gage and dial can be mounted at eye level in front of the operator.

AIR GAGE SYSTEMS come close to providing ideal solutions for many gaging problems. While, at the present time, air has been applied mostly to measuring inside diameters, it does a capable job in many situations checking outside diameters, thickness and width, as well as concentricity and squareness of various workpieces.

Measurement transfer is simplified by the use of air, as intimated above. Once the measurement has been "taken" by an air plug, ring or snap gage, it can be carried around corners — transferred in any direc-

tion — by the simple expedient of conveying the measuring pulses through flexible tubing. An air gage system will show an accuracy in measurement, calibration or repetition at least to 50 millionths. The gage user nowadays keeps air gaging in mind wherever he encounters a gage application problem. One word of warning is in order, however. Air gaging, because it has come to the fore so fast in the last few years, tends to become a fad. As a result, the gage buyer sometimes blindly adopts air when simpler, less expensive gages would serve as satisfactorily.

Electric and electronic contact devices are being used more and more in gage practice and application. If anything, the gage designer is allowed even more latitude as to where and how he will place the gaging contact, feeling certain that the ex-

act and accurate measurement secured by the contact will be transmitted to electric indicators or lights equally conveniently located for convenience of reading. The gaging system pictured in Fig. 20, earlier in this article, shows a number of electrical contacting heads, as well as air gage contacts and the wires and tubes which transmit the electric and air impulses to lights and dials. These general types of gaging systems (air, electric, electronic and air-electric) are separate subjects of such scope, however, that space limitations here prevent further, suitably full discussion.

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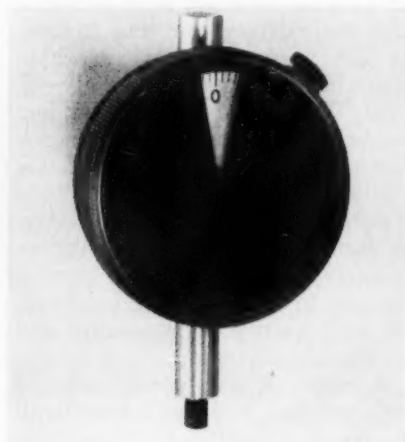


Fig. 26—This illustration shows a masked dial indicator which exposes for the operator only the tolerance spread on the dial.

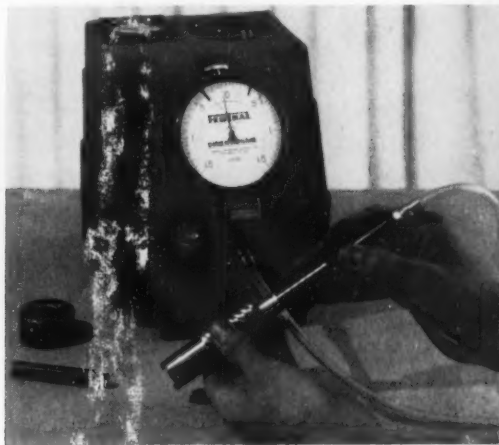


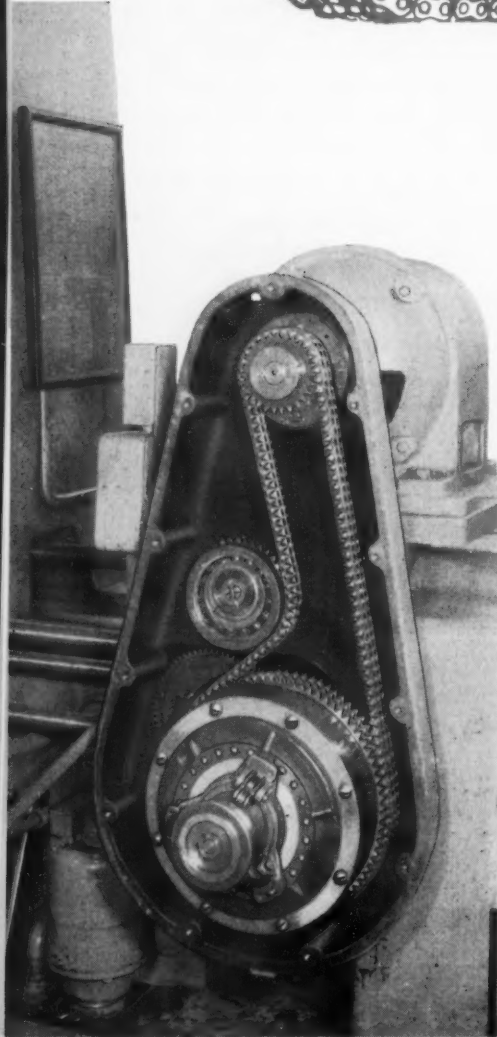
Fig. 27—This illustration clearly shows the effect of measuring workpieces by means of an air gage extension tube.

A detailed line drawing of a chain and sprocket. The chain is shown in a loop, with one end passing over a large sprocket. The sprocket has many teeth, and the chain links are clearly visible.

Chain Drives for

The advantages of both roller and silent chain drives in ensuring positive, non-slip and smooth power transmission are explained.

By JOHN E. HYLER

A black and white photograph of a large industrial machine, identified as a gear hobbing machine. The machine is complex, with various gears, shafts, and a large housing. A chain drive is visible, connecting different parts of the mechanism. The machine is mounted on a sturdy base.

MANY power transmission problems encountered in metalworking can be solved by means of a suitable chain drive. There are probably but few types of metal-working machines that have not been provided with chain drives from time to time. As the years have passed, chain drives have become increasingly efficient. The natural result of this fact has been the increasing use of such drives. Complete instructions are available from most manufacturers of power transmission chain relative to the selection of chain drives, properly designed for the service they are to render. Correctly installed, such a drive is economical and also highly efficient.

A chain drive properly selected and installed will not transmit all the shock it receives from the driving sprocket to the driven sprocket.

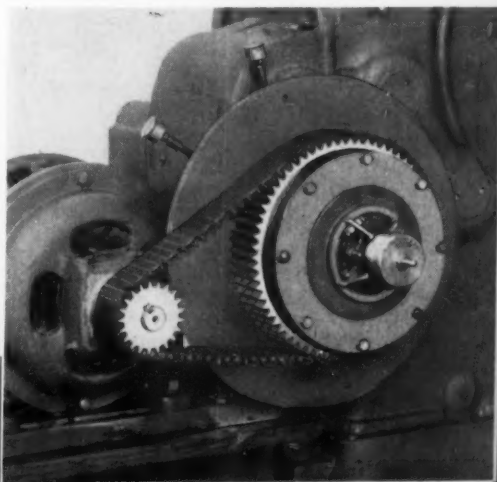
The gear hobbing machine shown here is provided with a duplex silent chain drive, incorporating an automatic idler. Illustration courtesy Link-Belt Company.

Metalworking Equipment

Much of the shock received is dissipated or absorbed by the many joints in the chain. If the chain is kept fully lubricated, it is obvious that its shock-absorbing capacity will be greater than otherwise. However, a chain drive is never as free from shock as a belt drive since the chain drive is positive and non-slip. Drives subjected to *severe* shock, consequently, are not usually fitted with power transmission chains.

There is an occasional case, however, where a drive *must* be positive, allowing no slip, although subject to quite severe shock, and where it is possible for a jam to occur which might damage the machine if an ordinary chain drive were employed. In such a case, a chain drive may be used which has one of its two sprockets of two-piece construction and fitted with a shearing pin. The sprocket proper is secured to its hub with the pin, which has a sufficiently low amount of breaking or shearing resistance to allow shearing before damage can be done to any part of the machine. In this manner, when a jam occurs, steps can be taken to relieve the trouble, whatever it is found to be, after which the drive may be restored to service simply by driving out the broken pin and inserting a new one.

Arrangements can easily be made for applying different shearing loads to chain drives on different machines without changing the drilling of sprockets and their hubs or without using a different diameter of pin. A standard-diameter pin, always made of the same material, can be adjusted to shear or break at *any* given load below its normal capacity, by the simple expedient of "necking" the pin or grinding a groove completely around its circumference at the natural shearing point. The pin will always break or shear at this reduced diameter. The lower the load at which the pin must be arranged to shear, to provide full safety for the machine, the deeper the necking groove is ground and the smaller is the amount of metal left standing at the reduced cross-section. Obvious-



This illustration shows an end view of a shaper equipped with a short-center silent chain drive. Illustration courtesy Ramsey Chain Company, Inc.

"It is virtually impossible for slippage to occur on a chain drive . . ."

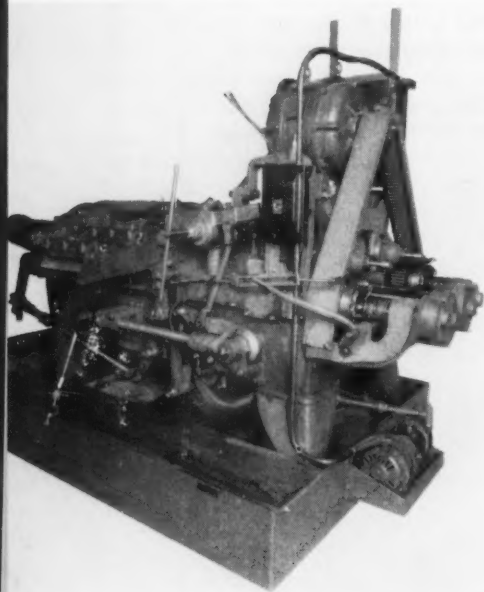
ly, intelligent use of a shearing pin on any drive where jams or other troubles may develop protects the sprockets and the chain, as well as the machine proper.

Chain drives have a definite advantage in being easy on bearings. It is never necessary to maintain a high degree of tension in a drive chain, since it is not a drive depending on friction for its efficiency. Chain drive efficiency stems from

the gear-like meshing of the chain with the teeth on the sprockets. Since tension at which a drive chain operates is usually very low, bearings supporting the shafts that can never be subjected to high pressure. As a result, the chain drive sprockets are a result, they have a very long life and maintenance on them is greatly reduced.

It is virtually impossible for slippage to occur on a chain drive in the sense in which it often occurs in belt drives. Neither can there be any creep. The only efficiency loss there is occurs from such rubbing and consequent frictional loss as occurs in the various chain and sprocket surfaces involved and the very low pressure resistance set up in the bearings.

THE EFFICIENCY OBTAINED through some of the smoother-running power transmission chains is of particular significance in metalworking. Power is delivered to feeds and other machining phases both positively and smoothly. This factor has much to do with obtaining really accurate work on many different metal-working machines. The driving force provided through a smoothly-running chain is in a slight degree elastic, but is fully positive. Thus, it remains equal at all times to provide the force required for doing the work involved at the particular tool feed rate being employed. No slipping or other vacillating factors can possibly be introduced, in consequence of which a steady and uniform rate of



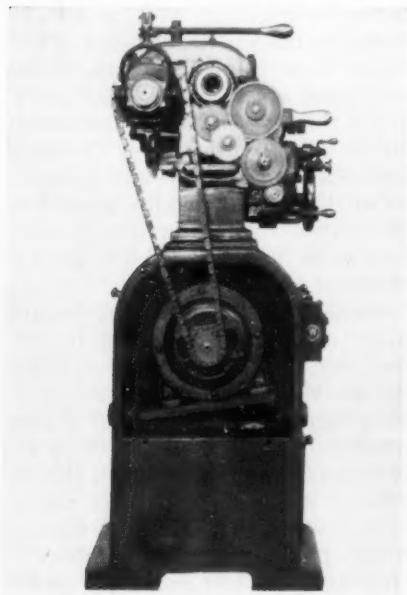
View of a nut making machine, with the driving motor mounted above the unit. The motor drives two spindles through a single silent chain, the travel path of the silent chain being roughly triangular. Illustration courtesy Ramsey Chain Company, Inc.

cutting is said to be obtained.

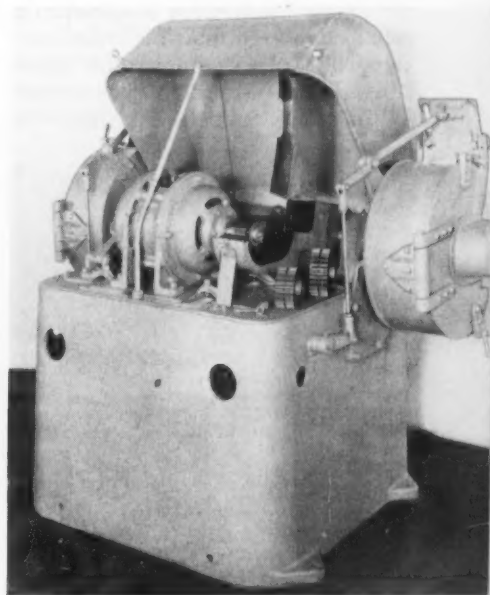
The natural result of this type of drive is smooth machining, which is so highly desirable. Even in cases where deflection may occur in machine parts due to cutting thrusts involved, those deflections are held constant where a smooth-running chain is used as a drive. Therefore, they are not reflected to any appreciable extent in the quality of work obtained. In other words, there is no chattering or other lack of smoothness in operation that is chargeable to the drive. Resultantly, metal is machined away smoothly. Smooth-flowing power is an asset on almost

any type of machinery, but on metal-working equipment it is of more value than nearly anywhere else.

Some types of chain drives are noted more for their versatility and, because of that versatility, they have solved many otherwise difficult design problems. Roller chain, for instance, is versatile and particularly so in regard to its use on over-and-under drives. While used considerably for straight drives where only two sprockets—a driving and a driven sprocket—are involved, the same drive chain can be run over and under as many sprockets as necessary, regardless of their placement, so



This illustration shows how a pivoted-base motor can be built into a machine tool base to operate in conjunction with a silent chain drive. Guard has been removed to show the motor mounting. Illustration courtesy Ramsey Chain Company, Inc.



This illustration shows a heavy type grinder from the rear. The motor, which is mounted on the rear of the base, drives the spindle of the machine by means of silent chain. Illustration courtesy Ramsey Chain Company, Inc.

"... it is not uncommon for manufacturers of roller chains to furnish drive chains in various numbers of strands..."

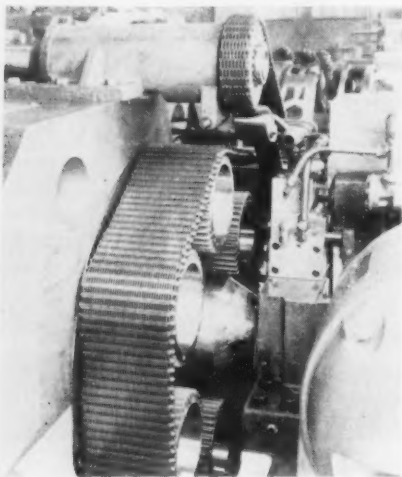
long as they are located in a given plane. The facility with which roller chain functions in this respect makes it possible to solve many highly intricate driving problems. This factor has much to do with the wide use of roller chain as a power transmission medium.

The amount of horsepower to be transmitted by a drive can be adequately transmitted by roller chain, whether high or low. Small-power drives which involve less than 1 h.p. are often fitted with single-strand roller chains. In multiple-strand design, roller chains are used on drives transmitting very high horsepower. While roller chains are in many in-

stances used as a first-reduction drive from a motor, other types of transmission chain are generally preferred for such duty. Roller chains find their highest usefulness in intermediate drives where travel speed is somewhat lower.

THE "PITCH" OF A ROLLER CHAIN, as it is called, refers to the center distances between the pins which connect the chain links. Roller chain is found in use having pitches as small as $\frac{3}{8}$ inch. Some standard roller chains have pitches as large as $2\frac{1}{2}$ inches. A full range of pitches in between these values is found. In an occasional case, a chain with a pitch larger than $2\frac{1}{2}$ inches is furnished, but on special order only. The earliest roller chains had only a single set of rollers in the width, being single-strand chains. For that reason, they were not adapted for use on drives of high horsepower.

Some time later, double-strand roller chain began making its appearance on some drives. Due to the efficiency demonstrated by this double-strand chain, triple and higher numbers of strands began to be incorporated into single drive chains. Now, it is not uncommon for manufacturers of roller chains to furnish drive chains in various numbers of strands up to and including twelve strands in a single chain. Chains incorporating a larger number of strands have also made it possible to use chains of shorter pitches on drives of higher horsepower. The shorter the pitch, the more smoothly



Two interesting silent chain drives are shown in this illustration applied to a multiple-spindle automatic. Illustration courtesy Whitney Chain Company.

a chain will travel and the more applicable it will be to a high speed drive. Thus, the use of multiple-strand chain has made roller chains more universally applicable to drives involving both high speed and higher horsepower transmission.

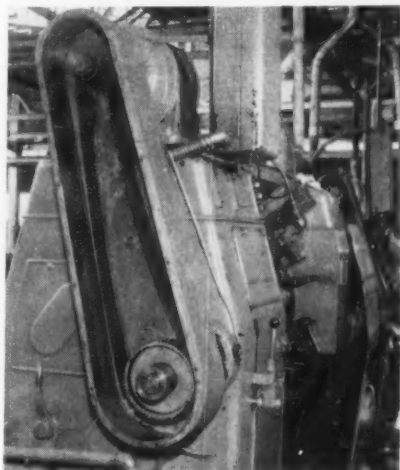
DRIVES OF ALMOST ANY LENGTH can be and are fitted with roller chain. In designing for drives where space may be limited, sprocket diameters may be consistently reduced where one is using shorter-pitch chain, since a practical drive is chiefly based on the minimum number of teeth on a sprocket. This fact has made it possible in many instances to use a roller-chain drive of very short pitch in locations where it would be almost impossible to use any other type of drive, due to the limited space available.

Cases arise in which it is necessary or desirable to disconnect a roller chain. Some types of drives call for disconnection more often than others. On some drives, there is never any need for chain disconnection except in the event of chain repair. Where it is necessary or expedient to disconnect a roller chain from time to time (as, for instance, to adjust chain length by inserting or removing chain links or link assemblies), chains made with headed pins that are cross drilled and secured by cotters on the ends opposite the heads are often favored, since such chains are easy to disconnect and reconnect.

ROLLER CHAINS are often made with riveted pins, however. On such chains, the heads must be completely ground from the rivets at one end before the rivets can be punched out

of place. Many chain drives are open. The chains on such drives may be removed from their sprockets and taken to a convenient bench for disconnecting, repairing, reconnecting, and so on. This is the preferred method where possible, but naturally it is necessary to disconnect and reconnect chain directly around the driving and driven shafts of any closed drive. Chain manufacturers generally provide tools suitable for use in disconnecting, repairing, and reconnecting their drive chains.

SPECIAL SPROCKETS of different types are supplied by some chain drive manufacturers to afford greater versatility. There are cases, for instance, where closed chain drives must be employed and yet where for one reason or another it may be necessary to dismount or remount the



This illustration shows a silent chain drive, provided with automatic lubrication, applied to an automatic screw machine. Illustration courtesy Link-Belt Company.

"... there are many cases where chain drives are used on drives having one adjustable center or sprocket."

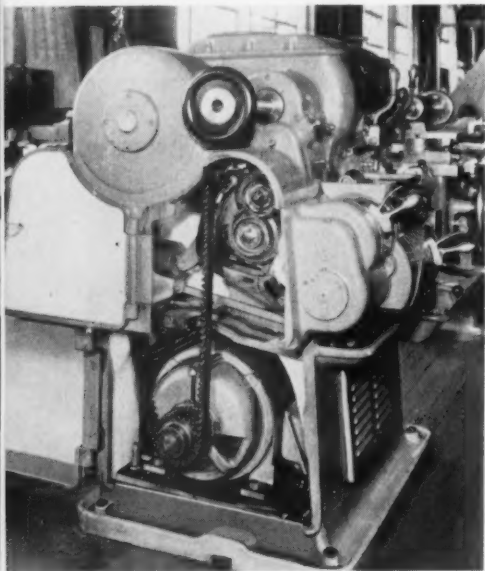
sprockets. This would call for actual dismantling or tearing down of the machine under ordinary circumstances. However, sprockets can be furnished which have both their web and their hub split. Thus, the two halves of a sprocket may be set and fastened together in such manner that they will function as a regular sprocket on the shaft.

Some manufacturers of chain drives have also supplied what they call a double-duty sprocket. This

sprocket has a solid hub; however, removable rim sections, in pairs, are applicable to this hub. The advantage of this design is that sprocket rim sections of differing diameters may be applied to the same sprocket hub or hubs. This arrangement provides a means for changing the speed of a chain drive. In cases where it is desirable to change the speed of a drive only occasionally and to be certain that speed changes are of definite given values (much as they are where change gears are employed), such an arrangement is often expedient.

ROLLER CHAIN (or in fact any type of drive chain) can only have a length that is some multiple of the pitch involved. The sensitivity of length adjustment possible is therefore limited to that which may be obtained by the removal or addition of one link, as the case may be. Thus, short-pitch transmission chain has the advantage of being more sensitively adjustable for length than long-pitch chain. However, there are many cases where chain drives are used on drives having one adjustable center or sprocket. Where this is the case, chain tension may always be precisely adjusted according to the wishes of the user.

There are various cases where chain drives have fixed centers and where there is no integral number of chain pitches that will provide proper chain tension. In such cases, idler sprockets are often used to bear



This illustration shows a toolroom lathe, with a motor installed on a pivoted motor base in the base of the machine and driving the machine by silent chain. Drip lubrication is employed on this silent chain. Illustration courtesy Link-Belt Company.

against the back of the roller chain to take up the slack. Preferably such sprockets should be used on the idle span of chain rather than against the driving side. Idler sprockets for this purpose are often arranged in so-called chain adjusters which are used in both automatic and manually-operated types of drives.

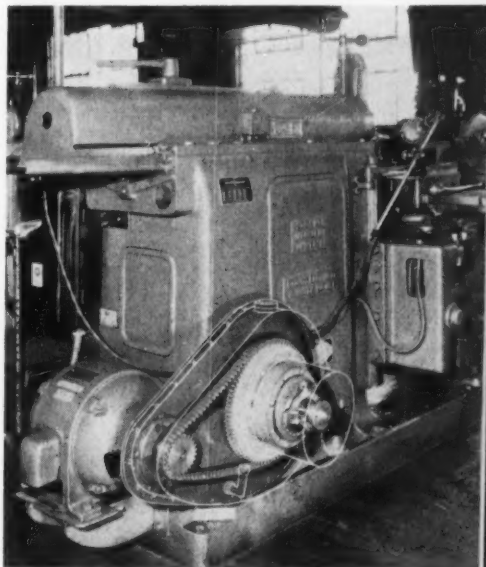
Silent chain runs smoothly and quietly, as the name implies. Such chains have been much improved since they first came into use. They are now widely employed. Automatic idlers or chain-length adjusters can be used in connection with silent chain drives, in the same general manner as roller chains. In the past, silent chains have not been considered adaptable for use on over-and-under drives. However, they were later designed and are now readily available for such use.

SILENT CHAIN has the advantage of being available in a smaller pitch than roller chain. Silent chain with a 3/16-inch pitch is obtainable from some sources. At the other extreme, silent chain runs to pitches approximately equal to the largest pitches in roller chain. Silent chain has its greatest advantage, and consequently its greatest range of application, on short-center drives. However, medium-length drives are quite often fitted with silent chain. Long-center applications of silent chain are not practical where the drive is high speed.

Silent chains differ from roller chain in regard to mechanical laws affecting their coupling together. The links of a silent chain are slightly staggered, widthwise of the chain. The widthwise staggering of

links is just enough to allow them to interlock and to be pinned together properly at each chain joint. Because of this widthwise staggering, one cannot couple the chain together normally and without offset unless the entire chain length is made up of an *even* number of chain pitches or links. It follows that on all drives where one of the sprockets is adjustable, thus allowing the distance of centers to be varied, the silent chain should be made up of an even number of pitches.

Computation is therefore somewhat different in figuring the length of a roller chain and that of a silent chain. In computing roller chain



The universal shaper shown herewith is driven by a silent chain of the middle guide type. The chain casing is indicated in phantom view. Continuous lubrication is provided for this chain. Illustration courtesy Link-Belt Company.

"... silent chains may be run at much higher speeds when they are of small pitch ..."

length, the actual pitch is used as an increment; that is, the chain length must be exactly divisible by one pitch. In figuring the length of a silent chain under ordinary circumstances, contrariwise, chain length must be a multiple of "chain pitch times two." Thus, assuming a silent chain of 3/16-inch pitch, the length of the chain must be divisible by 3/8 inch.

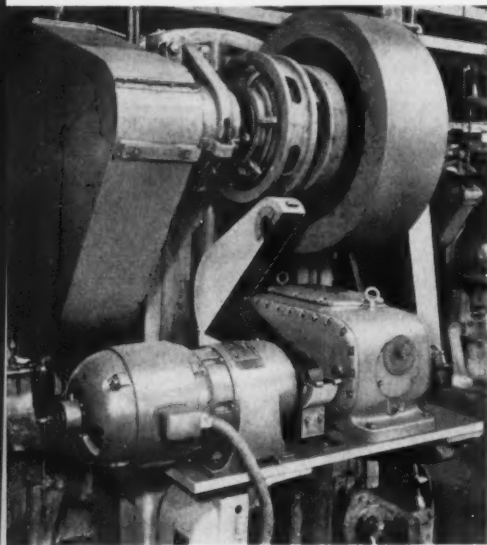
There is one method by means of which it is possible (in the case of fixed-center drives where more sen-

sitive control of length is especially desirable) to make up a workable silent chain containing an odd number of pitches. This is done by using a so-called offset coupler in the chain. Offset couplers three or five pitches in length may be obtained from silent chain manufacturers.

Like roller chains, silent chains may be run at much higher speeds when they are of small pitch than when they are of large pitch. While a chain sprocket is generally thought of as circular in form, it is in a practical sense polygonal. For example, a sprocket with eight teeth is in a sense octagonal.

THE SMALLER THE PITCH of a chain, the more teeth there will be around a sprocket of any given diameter. The more teeth there are in a sprocket, the more nearly it approaches true circular form. The more nearly sprockets approach true circular form, the more smoothly the chain will run. By the same token, therefore, smaller-pitch chains will always run more quietly than those of larger pitch.

Silent chains may be and often are quite narrow, but they can be made up to very great widths. This is often done where it is necessary to transmit very large amounts of horsepower. In fact, these chains are often rated at a given amount of horsepower per inch of width. There is scarcely any limit to the width to which such chains may be made up if necessary. Consequently, any



A silent chain is one of the components in the interesting composite drive provided for the press shown here. The upper half of the silent chain casing is thrown back so as to show the silent chain. Illustration courtesy Link-Belt Company.

amount of horsepower required may be transmitted by silent chain. Like roller chain, silent chain may be run in either direction with equal efficiency.

Silent chains do not deteriorate (unless it be from rust) when they are subjected to enforced periods of idleness. They are not adversely affected by atmospheric conditions, such as humidity, heat, or cold. In some cases, where a drive is to be idle for a long time, it is good practice to remove the drive chain and keep it in an oil bath. This protects it against rust and also lubricates every bearing surface in the chain so thoroughly that its life is greatly lengthened. Lubrication of these chains is also important from the ordinary standpoint. The drive is often enclosed in a casing which contains lubricating oil. Using an oil-tight casing in this way, there is never any difficulty in keeping a chain thoroughly lubricated by one means or another.

SILENT CHAIN provides a constant ratio of velocity and also a constant speed ratio. The practical speed-ratio range includes ratios differing as much as 14 or 15 to 1. Greater reductions in speed should not be negotiated at a single reduction, but rather in two steps, using two silent chain drives. Thus, if it is necessary to reduce the speed of chain drives in the ratio of 20 to 1, it could be effectively done with two silent chain drives, each having a speed of 10 to 1.

Due to the nature and design of silent transmission chain, it incorporates no side bars which will function to hold the chain from working

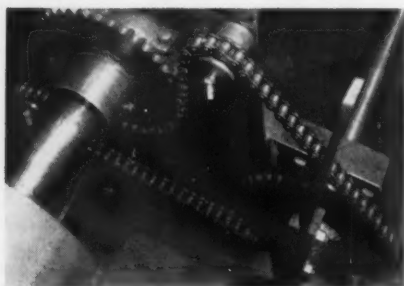
or sliding laterally off the sprockets unless they are specially provided. Special means must be incorporated to hold the chain in place laterally. Side bar flanges, as they are sometimes referred to, are quite often employed for this purpose. These flanges embrace the sides of the sprocket teeth. Therefore, the chain cannot drift off sidewise.

In other cases, silent chains are provided with middle guides instead of side bar flanges. A middle guide consists of a series of chain links which extends inward farther than the other links. This series of inwardly-extending links runs down the middle of the chain. The sprockets on which the chain runs are, in



This illustration shows a dynamometer testing machine, with a chain in the process of being tested. This particular setup is of 25 h.p. capacity for testing small-pitch roller chains. Illustration courtesy Atlas Chain & Mfg. Company.

"There is no reason why silent chain sprocket teeth cannot be machined on the periphery of a flywheel . . ."



The wire mill drive shown herewith uses two grooved idlers to guide the chain in such a manner that the driven shaft is turned in the opposite direction to the rotation of the driver. Illustration courtesy Diamond Chain Company.

this case, provided with a center groove running around the sprocket, which extends down through all the sprocket teeth and into the sprocket rims. The middle guide of the chain runs in these grooves.

Another method of confining silent chain to the sprocket faces widthwise consists in using side plates on the sprockets themselves. These plates extend to some degree above the teeth of the sprockets, so that the running chain is confined between them. Where such plates are used on the sprockets, it is not necessary to provide guides or bars on the chain itself. A special kind of guide, known as a wire flange retainer, is sometimes employed where silent chain drives are used in connection with independently-mounted electric motors.

CHAIN DRIVES are sometimes required on special layouts where it is

necessary that the drive shall not be a conductor of electricity while in operation. By the simple expedient of making one or both of the sprockets of vulcanized fiber or some other suitable non-conductor, this requirement can be met. There have been cases where it is desirable to incorporate a flywheel effect directly into a chain drive. This is also a simple matter. There is no reason why silent chain sprocket teeth cannot be machined on the periphery of a flywheel, allowing the flywheel to be used as one of the drive sprockets. Some manufacturers of silent chain drives, in fact, have supplied flywheels incorporating silent-chain sprocket teeth around their circumference for this purpose.

SOMETHING RELATIVELY NEW in power transmission is a type of chain claimed to incorporate a chain-and-sprocket engagement principle that nearly eliminates chordal action. The layout includes adaptation of an involute tooth design to the chain sprockets. Incorporated in this chain is a compensating rocker joint. This joint, during chain articulation, automatically shifts the pitch line as the chain engages the involute sprocket teeth. This allows the chain to follow a path that is truly tangent to the sprocket pitch circle. Since chordal action causes linear pulsation or vibration in a transmission chain, this near-elimination of chordal action greatly reduces vibration, wear, and noise.

Ordinarily, chain drives are not

thought of as permitting any change whatever in speed while in operation. This is indeed true of practically all chain drives. There is, however, a highly-special type of chain, designed to operate as the power-transmission element in a highly-efficient variable-speed drive. This chain may be said to be both self-forming and self-pitching. In fact, only a self-pitching chain could work in a variable-speed drive of the type in mind, because the chain obtains its pulling action on *tapered* radial grooves, machined in the faces of cone-faced wheels.

A pair of cone-faced wheels is used on the input shaft of the variable-speed mechanism, and a similar pair of wheels is mounted on the output shaft, at the other end. The pair of conical-faced wheels on the input shaft is arranged to spread apart as those on the output shaft draw closer together, or vice versa. As this action takes place, the speed of the driven or output shaft increases or decreases, as the case may be, while the speed of the input shaft remains constant.

RADIALLY-POSITIONED GROOVES are provided in the conical faces of these wheels to provide a gripping surface for the chain. This being the case, it is evident that either the grooves themselves, the metal left standing between the grooves, or both, must be tapered. The fact is that both are tapered equally. As a pair of these cone-faced wheels spreads apart, the chain is allowed to drop to a smaller-diameter engagement arc, nearer to the shaft. As a pair of the wheels are drawn together, the chain is forced to take a

larger-diameter-arc position nearer their outer edges where the grooves and the spans of metal left standing are wider. As this action progressively takes place, the pitch of the running chain must change progressively and automatically at each pair of wheels.

To provide for this condition, a chain was designed which has each link compositely made. Each chain link houses a cage. In each cage, a series of thin steel slats or laminations is mounted, with the length of the laminations running transversely or widthwise across the chain. The ends of these laminations engage the grooves in the wheels formerly described. These slats or laminations are free to move or shuffle endwise (which is widthwise of the chain), both individually and collectively. Thus, the conical and grooved faces of the wheels automatically form and pitch the chain continually, whether the drive is being used on a constant-speed or on a speed-changing basis.

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Top view of typical trim-and-drill fixture showing drill bushings cast in place with an epoxy resin. In this particular fixture, about

a 1/8-inch gap remained between the i.d. of the rough-drilled hole and the o.d. of the bushing which was filled with epoxy.

Time savings effected in producing trim-and-drill fixtures using an epoxy resin for casting bushings in place are pointed out.

By GILBERT C. CLOSE

DRILL bushings cast in place in trim-and-drill fixtures, using an epoxy resin as the casting medium, is a new development at Northrop Aircraft, Inc., Hawthorne, California. R. J. McIntosh, of Northrop's Production Engineering Research Development Group, who pioneered the process, points out that time savings in producing trim-and-drill fixtures with cast-in bushings ranges from 50 to 90 per cent. The epoxy resin anchors the bushing firmly in the fixture. The oversize holes in the fixture into which the drill bushings are cast may be drilled on an ordi-

nary drill press, or even a hand drill may be used if it is more convenient.

To produce the tool, the metal trim-and-drill fixture plate is first roughly contoured to fit the master and then rough-drilled with holes that are from 1/4 inch to 1/2 inch oversize on the diameter. The fixture plate is then normalized and sandblasted to clean it and roughen its surface. It is then faced against the master tool with the locating pins for the drill bushings in the master also protruding up through the oversized holes. The drill bush-

ings are then slipped over the locating pins and down into the oversized holes. The setup is then ready for the plastic casting process.

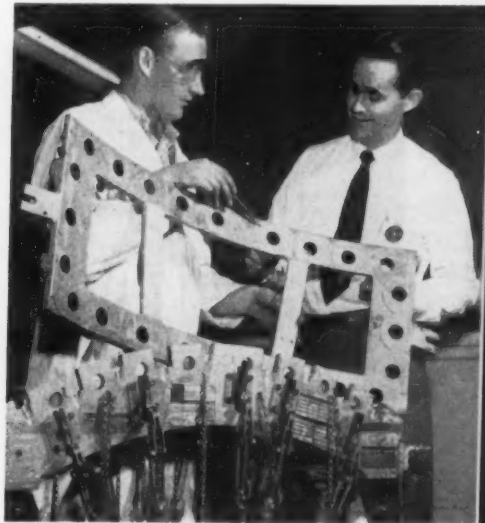
The epoxy resins come in liquid form along with a liquid catalyst. The two must be mixed together within 30 minutes of their use. All of the epoxies are of the thermosetting variety. While the epoxy resins will set up or harden at room temperature in from 4 to 8 hours, several varieties exhibit better physical properties when cured at an elevated temperature of 150-200 deg. F. Both types are in use at Northrop, and while there has never been a bushing failure during production use of a tool, McIntosh points out that under test conditions, some of the resins that are cured at elevated



Operator is shown rough drilling a trim-and-drill fixture with a hand type drill prior to casting the drill bushings in their proper positions in the fixture.



A production trim-and-drill fixture with cast-in bushings in use on the production line. Many such fixtures have been used to make hundreds of parts with no bushing failure.



Trim-and-drill fixture after rough drilling was completed. Note large size of holes into which 1/2-inch inside diameter drill bushings will be cast.

"... the time saving in tool production becomes important ..."

temperature seem to exhibit better physical properties for bushing installation.

After the resin is mixed, it is poured around the drill bushings on the locating pins in the master tool set-up to fill the gap between the bushing o.d. and the i.d. of the oversized hole. Drill bushings ranging in size from 1½-inch i.d. down to ¼-inch i.d. have been installed in this manner.

In a typical test to push out an epoxy-cast bushing of ¼-inch i.d., ½-inch o.d. and ½-inch long, a direct axial load of 5000 lb. was required to start it from its place. Tests reveal also that even after the

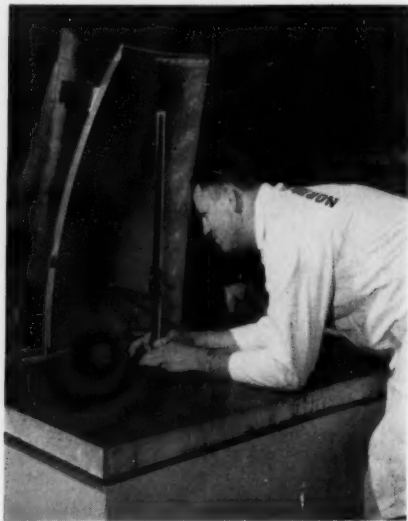
cast-in bushing is loosened, it is still difficult to drive out.

These same epoxy resins are also used at Northrop for facing both the master tool and the trim-and-drill fixture taken from it. The master tool face is prepared by casting it against a mold. The fixture face is then cast using the master tool face as a mold. This eliminates the time-consuming necessity of grinding, bluing, checking and regrinding to bring the tool faces to the proper shape and contours. Both metal and fiber-glass fixtures are faced in this manner.

McIntosh summarized the advantages of the new cast-in bushing and tool facing processes in this way . . . "The primary contribution is time saving. But in the aircraft industry, where part runs are always limited and the amortization of tool costs



Cast-in drill bushings are an integral part of this form block for an airplane nose assembly.



Checking the location of a cast-in drill bushing in a mold drawn from form block.

constitutes a substantial percentage of the cost of each part, the time saved in tool production becomes an extremely important factor."

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Giant Stretch-Wrap Forming Machine

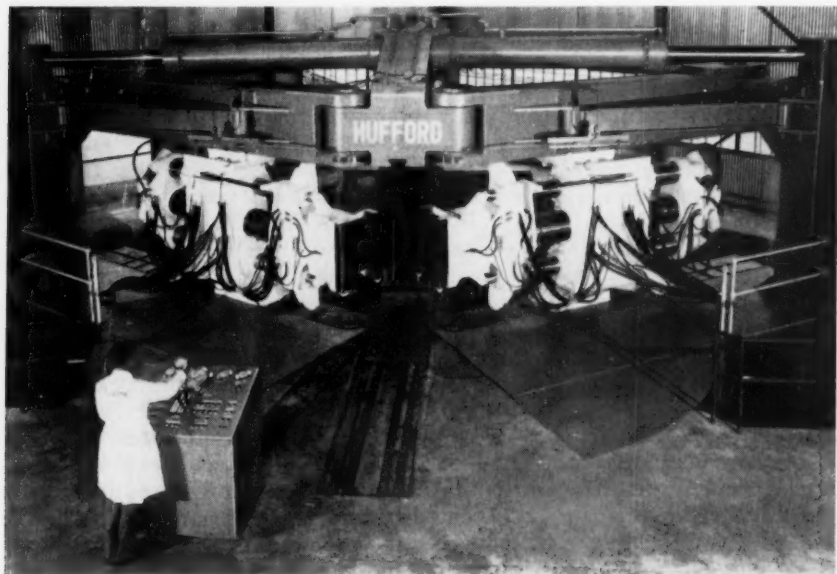
THE Hufford Model 60 Stretch-Wrap Forming Machine illustrated herewith was recently installed in the plant of Rohr Aircraft Corp., Chula Vista, Calif., for the purpose of producing aircraft components for air frame manufacturers in the Pacific area. The machine, which has a stretching capacity of 350 tons and measures approximately 60 feet across the face by 20 feet high, forms parts from both extruded material and sheets by stretching

and simultaneously wrapping the stock around a stationary die. The two large arms are pivoted near the central die location and are wrapped back by means of four huge hydraulic actuating cylinders. Twin barrelled tension cylinders, each exerting 703,720 lb. of stretch, are mounted on the arms. These cylinders may be positioned for any desired spacing between the jaws, accommodating various work lengths.

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11

POINTS FOR CHECKING YOUR SUPERVISORY QUALITIES



How Good A Boss Are You?

By ALFRED M. COOPER

In this article, the author develops a practical 11-point supervisory check sheet—based on his own experience in metalworking plants—by which foremen and office managers may evaluate roughly the quality of their own supervision.

FIFTY years ago any supervisor could readily solve his knottiest managerial problems simply by barking at some unfortunate subordinate, "You're fired!" Now that production has become so complex, and management is so keenly alive to replacement costs and good employee relationships, the harrassed present-day supervisor may well be excused if he sometimes looks backward with longing to those halcyon days when the labor market was inexhaustible and the boss could do no wrong.

In shop, field and office, the quality of supervision has improved steadily, yet every survey of employee attitude appears to indicate there is room for further improve-

ment. Most peevs which the workers register against their companies today have to do with irritating contacts they have had with an immediate supervisor. Granting that certain of these complaints have no basis in fact, it is important that the key man get results without creating discord.

With this in mind it may be interesting for the supervisor to study the following questions and comments as a check on the efficacy of his efforts to direct the activities of others. Each point listed was suggested by an executive of broad experience, and considered by him to be important. The man who is yet to be promoted to supervisory rank likewise may profit by thus analy-

zing his capacities for successful supervision.

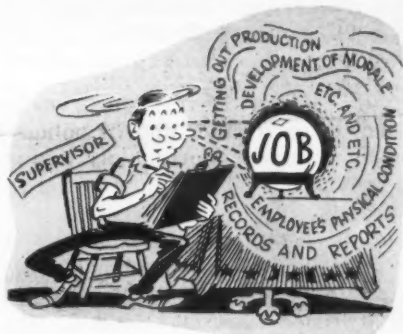
1. Can you plan your work ahead?

No supervisor can schedule his time and energies to best advantage until he knows exactly what he is responsible for and has analyzed his job in terms of the relative importance of his responsibilities. Experience proves that until the supervisor gives real thought to this matter of analysis there is an excellent possibility that some of his responsibilities are being slighted, while it is not uncommon to find routine or emergency responsibilities that appear to belong to no one, or which are apparently the responsibility of two or three supervisors.

Such hiatuses or overlapping can be eliminated if each supervisor analyzes his own job and establishes, from experience, a scale of importance for such common responsibilities as getting out production, development of morale, employee physical condition, records and reports, and so on. It is then not difficult for the supervisor to allot approximately the proper time and energy to the discharge of each responsibility, in terms of its importance in that particular department, and thereafter know that his planned work schedule will make his supervision both well-balanced and complete. No one but the supervisor can make a proper analysis of his own responsibilities.

2. Do you like your subordinates?

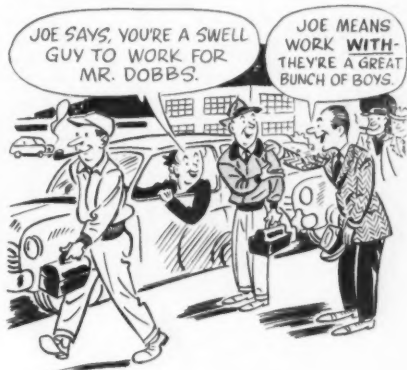
It has always been conceded that a supervisor, to be successful, must win the liking of those reporting to him. But this in itself is not enough.



"... overlapping can be eliminated if each supervisor analyzes his own job..."

Experienced executives contend it is difficult to establish a proper boss-worker relationship unless the supervisor genuinely likes a majority of his subordinates.

Where mutual liking is absent (and we have all known supervisors who positively disliked most of those reporting to them) the work force may find fault with superiors, while supervisors may be outspoken in



"... it is difficult to establish a proper boss-worker relationship unless the supervisor genuinely likes... his subordinates."

11 Points for Checking Your Supervisory Qualities

their criticism of their own workmen, of each other and of policies of management. Fortunately this is a rare type of situation, nevertheless it exists.

Conceivably, a supervisor who was meticulously fair in his treatment of all subordinates might avoid serious friction, even though he was concealing his dislike of these people. Judicial fairness is difficult of attainment and probably impossible for the Old Scrooge we are discussing. On the other hand, a supervisor who likes those reporting to him may well be excused by his subordinates for occasional lapses in this respect. On occasion, a supervisor may find it advisable to make changes in the personnel of his department, should he find himself saddled with

too many individuals who were not only unlikeable, but who could not learn to react well to friendly supervision.

3. Are your orders obeyed promptly and fully?

In analyzing their own jobs, foremen and office supervisors usually are altogether realistic. *They agree, for example, that their primary responsibility is that of getting out production. Unless they can meet this obligation, they contend, there is an excellent chance they will be replaced.*

Since, in any department, the giving of orders and the manner in which these are carried out have a lot to do with getting out production, a check must be made here. The speed and effectiveness with which orders were obeyed may at one time have indicated the degree of fear entertained by the workman for his boss. Nowadays these are likely to indicate the confidence of the worker in the fairness, job knowledge, and judgment of his foreman. Such confidence can be based only on experience, which has demonstrated that the boss's orders are likely to be reasonable, are never arbitrary and may well be obeyed promptly, and as given.

Where subordinates feel justified in questioning any order before carrying it out, there is something wrong. This is no time for instruction. For one thing, the time element may well make it impossible to explain why any order has been given, and such explanation should never be essential to prompt action on the part of a subordinate when an order has been issued.



"... their primary responsibility is that of getting out production ... or they will be replaced."

The supervisor who is having difficulty getting his orders obeyed as given will do well to check the degree of forcefulness with which his oral orders are issued, and also should determine by a mental check that the who-when-what-where elements of a proper order are either explicit or implicit in the wording of any order.

4. Do you know how to make people do what you want them to do?

Educators call this motivation, but it has been practiced in all human relations for ages. Wives are especially good at it. It is the essence of good salesmanship. Its application gets things done smoothly and apparently effortlessly. The ability to properly apply this motivation distinguishes the leader of men from the driver.

The boss who can make a subordinate's job interesting to him, and who knows how to make that job important in the eyes of the worker, will have little trouble in

sufficiently motivating those reporting to him. The boss wants adequate production of good quality, and this is exactly what the subordinate wants to turn out if he is being properly supervised.

A supervisor can make a job interesting by giving credit for good work, by removing unnecessary annoyances, by checking the worker's physical capacities and by reducing accident rates. It is quite possible to overdo motivation. Employees may get fed up with too frequent and too obvious efforts to spur them on to greater exertion by the application of motivation in one form or another. For example, comparison of production records in like departments or plants may have value as an incentive factor, but this is true only when such motivation has not been worked to death.

5. Do you know when and how to deliver an effective reprimand?

Any consideration of supervisory procedure that does not cover the



"... motivation ... has been practiced in all human relations for ages. Wives are especially good at it."



"Any consideration of supervisory procedure that does not cover the when and how of reprimanding must be wholly unrealistic."

"... the reprimand must be fitted to the individual."

when and how of reprimanding must be wholly unrealistic. Should the day ever come when all orders are carried out promptly and exactly as given, then the supervisor can forget about reprimands. Until then,

he will do well to study his methods of calling attention to oversights in these matters. For years emphasis has been placed on doing all reprimanding in private and most supervisors subscribe to this in theory. However, only recently in a defense plant I happened to hear a foreman shout at a worker, "Hey you! What in hell do you think you're doing?"

That sounded somewhat like a public reprimand.

The objective will be to make the reprimand sufficiently effective with each individual so that it will be a long time before another one is necessary. Experienced executives contend that the reprimand must be fitted to the individual; that a few words will suffice with an intelligent subordinate, but more time and effort must be devoted to the obtuse or stubborn worker. The desideratum here is that, when the reprimand has been completed, the employee

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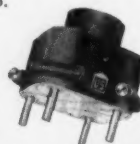
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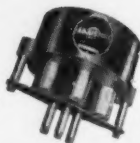
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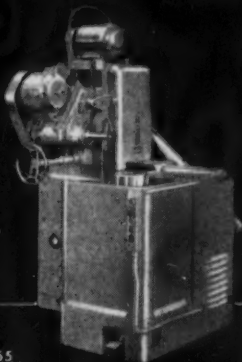
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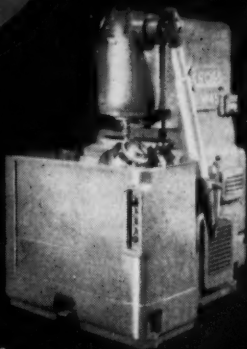
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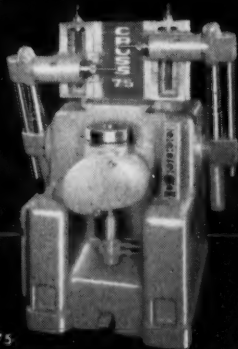


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11 Points for Checking Your Supervisory Qualities

knows exactly why he has been corrected, holds no resentment, but feels inclined to avoid further errors in the future. Thereafter there must be no carryover of censorious attitude on the supervisor's part.

"Soft supervision," of the sort which is practiced by those who believe reprimands are never called for, is ineffective, costly supervision. We saw too much of this sort of thing in our industries during World War II. When consistently practiced it places a premium on sloppy workmanship and develops a curious and unpleasant type of prima donna subordinate — a person something like the "little monsters" we see among

the children of parents who refuse to correct their progeny for fear of inflicting a "psychic wound."

A supervisor should never be put in the position of being shorn of too much of his rightful authority, for then he must attempt to get results by wheedling, wasteful, roundabout methods of persuasion in which polite suggestions must replace the issuance and following up of result-getting orders.

6. How much responsibility are you willing to assume if a subordinate of yours is injured on the job?

In this matter of the supervisor's responsibility for injury there is, of course, no set rule to determine when the head man is at fault. Some authorities contend that, if he has a say as to who goes to work in his de-

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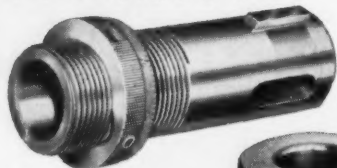
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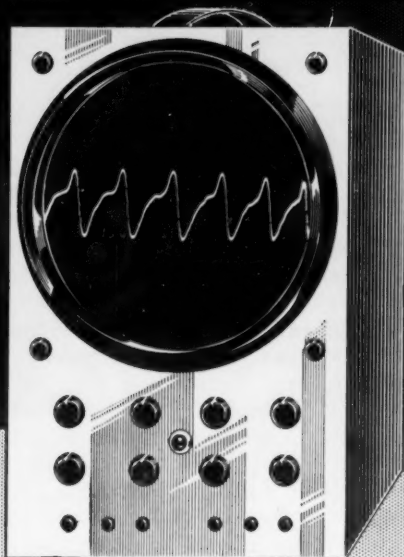
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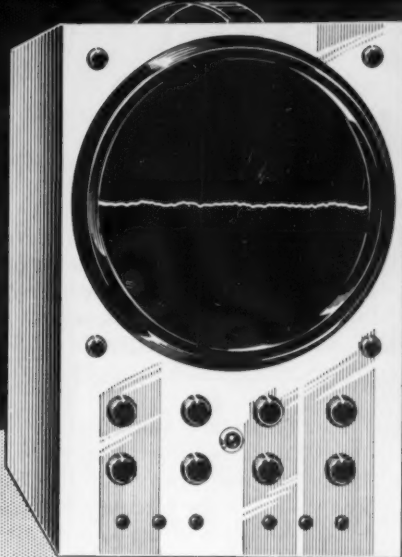
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partment, and is permitted to train these people, he is always responsible. Others believe he is responsible for all injuries, except those that are demonstrably unpredictable — a rather difficult rule to apply in practice.

The important thing here is not the technical degree of responsibility for accident prevention that may be assigned to the foreman, but rather the readiness of the supervisor to shoulder such responsibility. If accidents were desirable there would be no problem here, but a supervisor may be censored for having too many of these in his department, and in some plants I have known of a foreman being allowed, say, three serious injuries within a year's time among his subordinates, after which he was relieved from duty.

Thus, the foreman who accepts responsibility for accident prevention demonstrates genuine awareness of his unique on-the-job relationship

with his subordinates, wherein he can combine daily safety instruction with routine production supervision. It is better for management to absolve the supervisor of all responsibility for an accident than for the foreman to assert his lack of culpability.

7. Do you consider your brother supervisors to be high-grade men?

It is not reasonable to expect any supervisor to entertain a high opinion of all his brother supervisors. But in the average industrial organization a majority of the supervisors should measure up to certain minimum standards in the qualities of supervision we are considering.

Therefore, if the supervisor gives all his fellow-bosses blanket high praise he probably is not being altogether sincere. In the give-and-take of production supervision it is inevitable that some friction will develop, and this must in some degree color the opinions supervisors entertain toward one another.

But even worse than such evasion is the situation, occasionally encountered, in which a foreman may speak



"... if he has a say as to who goes to work in his department ... he is always responsible."



"... if the supervisor gives all his fellow-bosses blanket high praise he probably is not being altogether sincere."



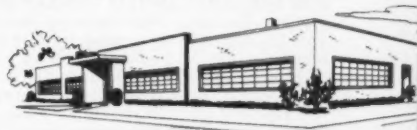
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disparagingly of all, or nearly all, of his brother-foremen. Such a boss has a real problem to work out in learning to cooperate with men of equal rank. In some instances the fact that a group of foremen are in competition for the job ahead may lead a short-sighted individual to take a dim view of his fellow-supervisors.

It might appear that the boss who got along well with his own subordinates would also cooperate well with supervisors of equal rank. But it sometimes develops that a particular supervisor has a natural penchant for developing a group of subordinates who are fanatically loyal

to him, yet who cooperate poorly with the employees of other departments. The foreman of such a tight-knit group usually encourages this insularity and clannishness and may set the example by cooperating poorly with other foremen. Most foremen like most of their fellow-foremen and are determined to get along with the remainder of the supervisory force.

8. Are you satisfied with the rapidity with which you have been promoted?

This is not a trick question, but it is one that cannot be satisfactorily answered without thought. In exceptional instances a supervisor may have been so fortunate as to have been shoved rapidly ahead, and in this case a flatly affirmative reply would be in order.

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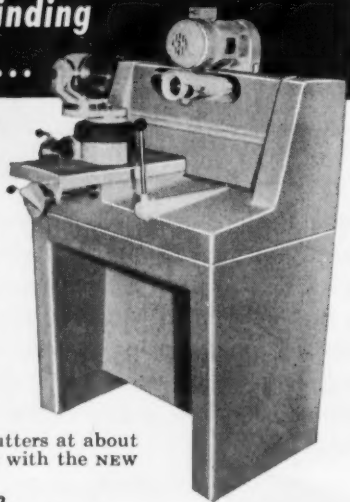
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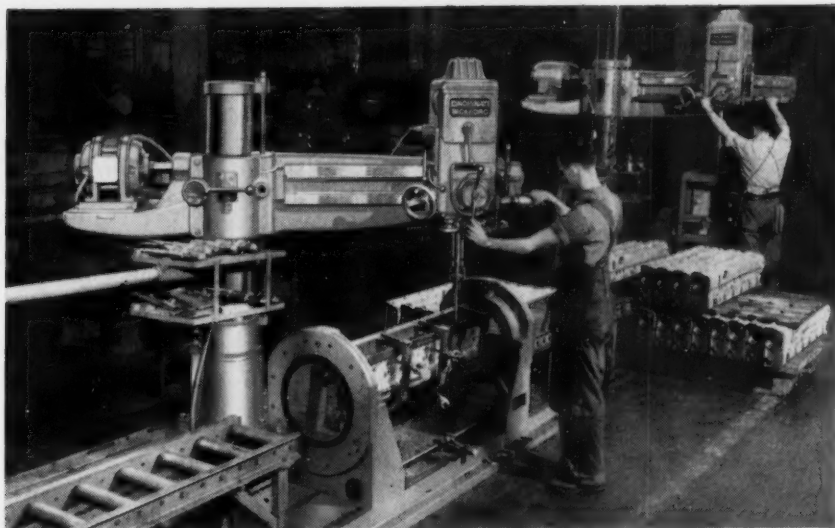
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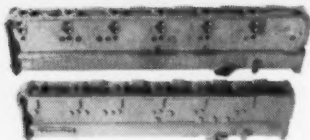
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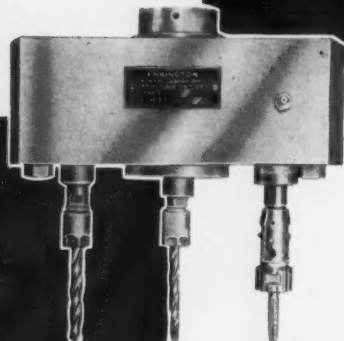
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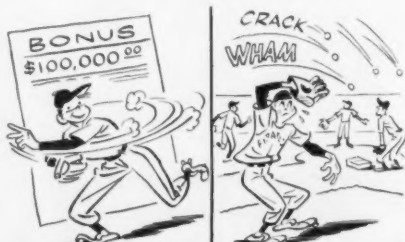
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"Most supervisors would like to see promotions come oftener..."

In most cases, however, promotion to worthwhile supervisory jobs comes rather slowly, and this is perhaps a good thing. It takes time to learn how to supervise people and the process cannot be much hurried. Whenever this has been attempted the results have not been satisfactory. *Apparently there is no adequate substitute for experience — years of it.*

Most supervisors would like to see promotions come oftener, yet unless others are being advanced over their heads they do not feel too strongly about the matter. They believe that if they do a good job they will not be overlooked when a better job is open, and in the meantime running their departments is sufficiently interesting and demanding work.

Thus, it may be said of the supervisor who is wholly satisfied with his rate of advancement, and of the one who is thoroughly dissatisfied with the frequency of promotions, that each may need to give a bit



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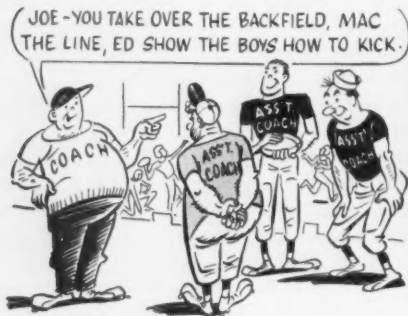
11 Points for Checking Your Supervisory Qualities

more thought to this matter of getting ahead.

9. Do you know when and how to delegate authority to others?

In a minor supervisory job the boss may get by for years without finding it necessary to trust others with authority. But unless he eventually learns to delegate authority, including when and how much, he definitely limits his own chances of advancement. Once executive rank is reached this matter of delegation must be studied carefully in order to ascertain the load any assistant may safely be expected to carry.

Delegation should be practiced as early as possible if for no other reason than that management often hesitates to promote a supervisor who has failed to develop a good second man. *The only way to properly teach an assistant how to run a department is to delegate to him sufficient authority to run it, whenever this is possible.*



"The only way to properly teach an assistant how to run a department is to delegate to him sufficient authority to run it . . ."

Since the supervisor can delegate authority to an assistant, but must continue to be responsible for any errors this man may make, it calls for a certain steadfastness in the make-up of the boss before he can trust not only a subordinate with authority, but also his own judgment to select men who may be entrusted safely with authority.

10. Are you a good teacher?

In every industrial organization we find one or more executives or supervisors who have acquired enviable reputations as developers of men. Throughout the plant, service in such a department is considered as something special in the experience record of any employee, and these people are always in demand in other departments and as supervisors.

The head of such a department is unusually proficient as a teacher. Any knowledge or skill he has acquired over a period of years he can readily impart to others and in such a manner that the teaching job does not have to be repeated. And he takes genuine pleasure in doing this.

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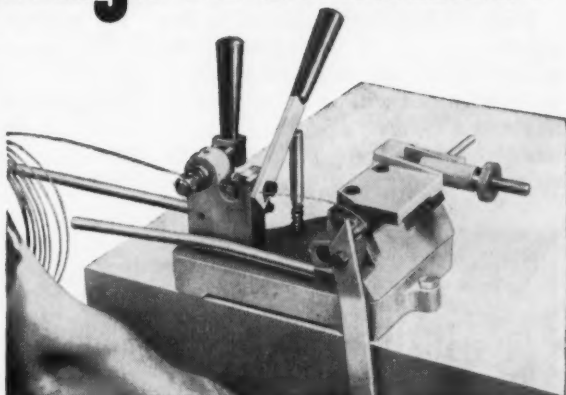
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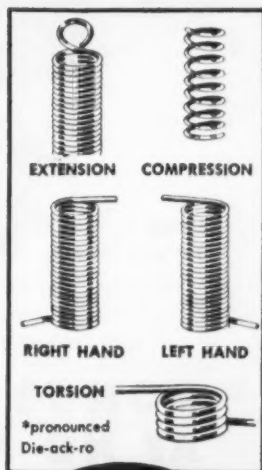
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"... he evaluates the job ... in imparting information ..."

Such a supervisor or executive has given thought to the proper sequence of operations in the teaching process, and it will be found that he has the following criteria in mind when he evaluates the job he is do-

ing in imparting information to a subordinate:

(a) He ascertains the limits of the learner's previous knowledge of the subject, and thus bases his instruction on something the employee already knows. Failure to take this preliminary precaution accounts for most of the serious breakdowns in industrial teaching.

(b) He puts over his new ideas in an instructional order, according to a scale of difficulty based on experience, rather than in a production sequence in which the most difficult lessons might well come at the outset.

(c) He breaks up the material to be taught into small lessons, so that the learner has little difficulty grasping the new ideas in each lesson.

(d) He gives the subordinate plenty of time and opportunity to try out the new ideas in practice before expecting proficiency, but eventually insists that the learner

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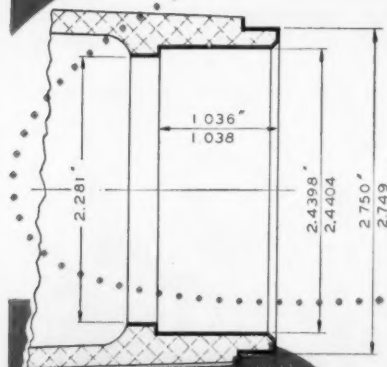
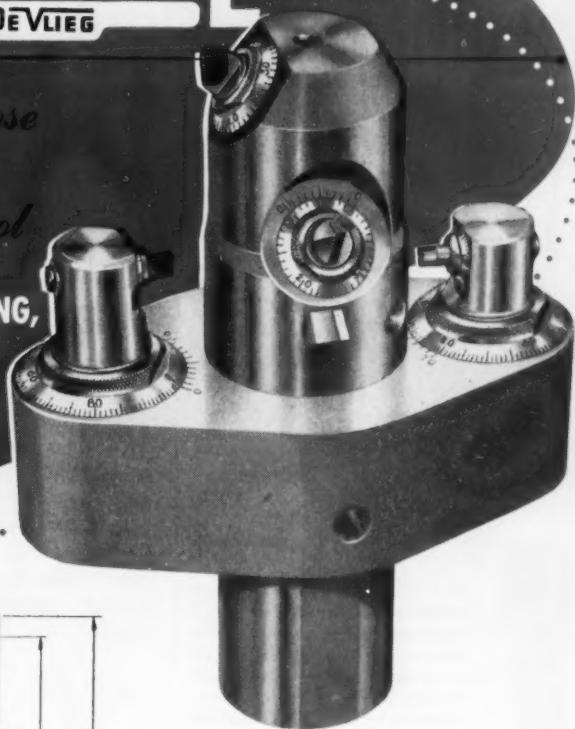
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single point
adjustable tool*
for
**PRODUCTION BORING,
TURNING and
FACING
OPERATIONS.**



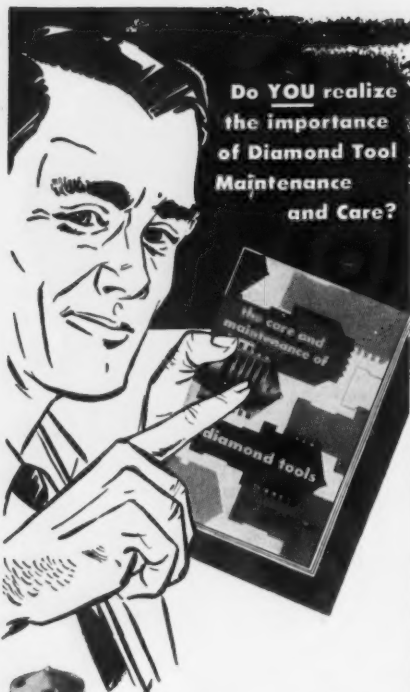
SURFACES MACHINED
ARE INDICATED
BY HEAVY LINES

Illustration shows typical example of cluster tooling using standard Microbore units for machining seven surfaces on a main bearing housing at one pass. Each tool is independently adjusted by proven micrometer vernier principle and precise limits of accuracy are maintained on production runs.

DEVILIEG MICROBORE COMPANY

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Stakeool Model



Cluster Model

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11 Points for Checking Your Supervisory Qualities

can demonstrate that he has mastered each lesson. He does all of these things so smoothly that the subordinate is unaware that his superior is consciously employing the best teaching technique.

(e) Above all, the unusual developer of men has succeeded in mentally putting himself in the place of the learner, and thus can properly plan lessons and make allowance for the difficulties facing the employee who must grasp these new ideas. Such a teacher is a valuable man in any organization.

11. Can you defend a policy laid down by management even when you have not been informed of the reason for this ruling?

Any group of experienced executives rates loyalty as one of the essential eight among the qualities of leadership. *Loyalty in the case of*

YOU'VE GOT TO TRUST IN ME—JUST PUT YOUR HEAD IN THE OPEN MOUTH!



"Loyalty in the case of the supervisor is a measure of the confidence he has in his management."

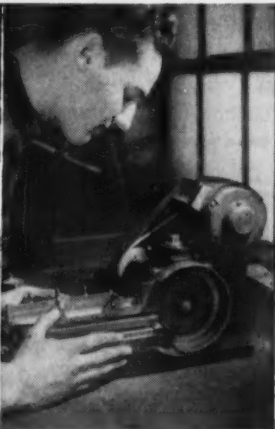
Increase the productive capacity of your machine tools with DUMORE TOOL POST GRINDERS



Dumore grinder mounted vertically on Bridgeport Mill for internal grinding.



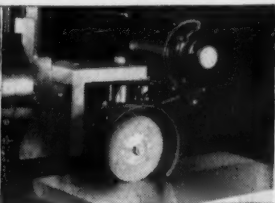
Mounted on a Turret Lathe, Dumore Grinder takes its turn in sequence of operations.



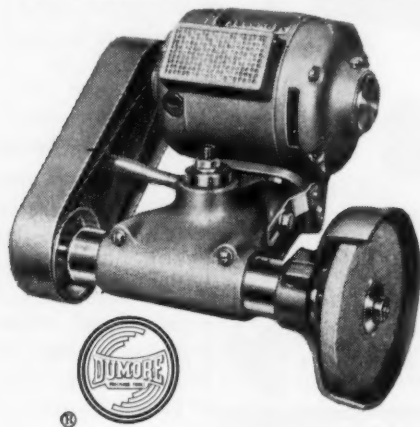
Bench mounting is easiest of all. Easily combines with special fixtures for efficient service.



Mount a Dumore Grinder on the clapper box of a planer for surface grinding.



Dumore Grinder mounted on ram of shaper with right angle plate for surface grinding.



Builders of precision line of Grinders, Automatic Drill Heads, Tool Post Grinders, Drill Grinders, Light Drilling Equipment, Flexible Shaft Tools, Hand Grinders, Fractional hp Motors and Gear Motors.

THE Dumore Tool Post Grinder is so *versatile* it can be mounted on any standard machine. So *accurate* it can perform internal operations to .0001".

Try setting up your next job so work can be machined and finish ground to size with a Dumore in the same sequence of operations. You're sure to find a Dumore is the fast, low-cost answer to grinding operations.

Production men have found a Dumore precision Tool Post Grinder often pays for itself on the first job . . . and keeps right on working and saving through years of trouble-free service.

See your industrial distributor or write

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PRECISION TOOLS

1311 Seventeenth Street • Racine, Wisconsin

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**"The only kind of loyalty . . .
is 'blind' loyalty . . ."**

the supervisor is a measure of the confidence he has in his management. If he feels their decisions are uniformly fair, in terms of the welfare of employees and stockholders, he can wholeheartedly support any

policy so laid down even though he has no idea why it was formulated and even though, on its face, it appears to differ sharply from earlier action on the part of management.

The supervisor who feels he must determine for himself in each instance whether or not he favors, and can support, a policy of management which has not been explained to him

is probably working for the wrong company. The only kind of loyalty that is worth much when the going is rough is what is usually termed "blind" loyalty, since, as in the case of orders issued by the foreman, the time element may make it impracticable in an emergency that everyone affected be informed of the reasons behind an order before it is to be adhered to. Furthermore, the supervisor, even though himself in the dark, must be able to sell the new policy to his subordinates.

In the foregoing we have dis-

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cussed briefly eleven major divisions of supervisory responsibility. These are, (1) ability to plan work, (2) attitude toward subordinates, (3) ability to command respect, (4) ability to motivate others, (5) effective control of group, (6) voluntary assumption of responsibility, (7) cooperation, (8) personal ambition, (9) delegation of authority, (10) developing subordinates and (11) loyalty.

Supervision is a difficult and exacting art, and it is well to bear in mind that perfection in human relationships is something unknown. Thus, if the supervisor were to score himself in each of the phases of supervising listed above, certainly there would be no perfect scores. Averaging just above 70 in these 11 factors might appear to be a mediocre showing. Actually, this would not be a bad score. The supervisor who can conscientiously give himself an average of 70 on these 11 factors probably is a very good boss.

★ ★ ★

Stampings Film

"**STAMPINGS** for Electronics," a 20-minute full-color and sound motion picture, has been produced by John Volkert Metal Stampings, Inc., Queens Village, N. Y. The film takes the audience into Volkert's modern plant to see how millions of precision parts are produced daily for the fast-growing electronics industry. Each department — design engineering, tooling, production, inspection, finishing, assembly, warehousing and shipping — is shown making its specific contribution to

the total job of volume stampings production for radio and television sets, electronic tubes, radar, military communications equipment and a wide variety of other electronic assemblies. Depicting how accurate progressive dies are designed, built and put to work in automatic production equipment in the Volkert plant, the film demonstrates the "precision-in-production" method that has lowered stamping costs.

For more data circle 3 on Reader Service Card

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

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*"The slogan of the 1955 Machine Tool Show — **THE WORLD'S BEST INVESTMENT IN ACTION** — signifies the importance and the progress of machine tools to metalworking production. The visitor to the Show in Chicago, September 6 through 17, will be afforded the greatest opportunity to consider the replacement of obsolete machines with new models, learn new methods in production, and many suggestions for savings which are all necessary to maintain a competitive position."*

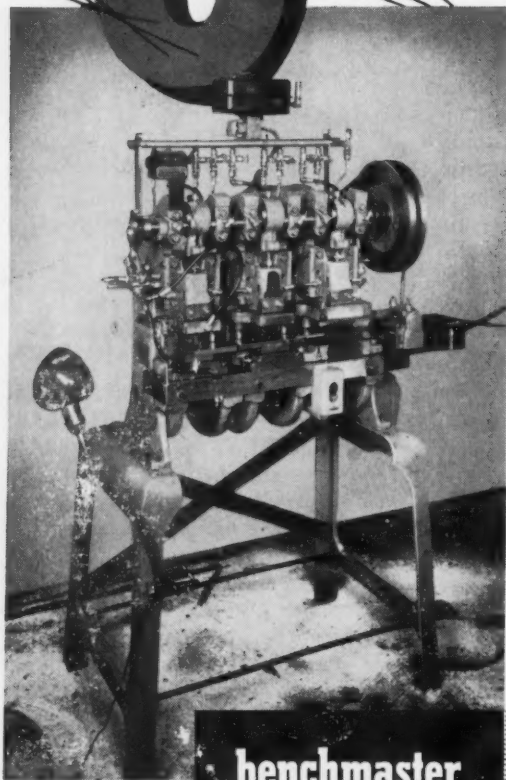
William E. Rutz,

Chairman, Machine Tool
Show Committee

3

benchmasters

*on a single crankshaft
triple press output,
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benchmaster

These 3 small, 4 ton Benchmasters are now doing the job of *one large press*, at a fraction of big press cost. Production is three times greater, die maintenance easier, downtime reduced next-to-nothing.

Originally the progressive die used was of one-piece construction. The first stage required frequent sharpening, necessitating complete shutdown and dismantling. Die is now divided into 3 components, each successive stage on its own Benchmaster.

When the first stage needs sharpening, a duplicate die is inserted. Press time is almost continuous, die hazards are greatly reduced. Instead of 100 strokes per minute on the old press, the Benchmasters run at approximately 300 rpm — with tripled output! This is another case of reduced costs and improved production with Benchmasters — first choice in small punch presses and mills!

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production $2\frac{1}{4}$ times!**

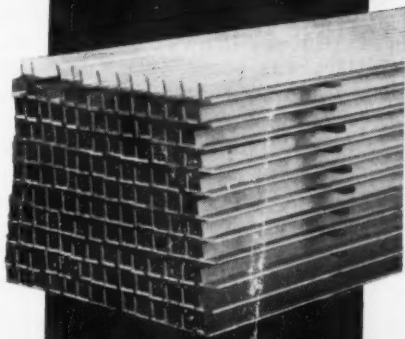
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**Improve finish;
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"Helicarb's" cutting angle is constant over the full length of the flute, producing a unique, shearing cutting action. Chatter and impact is sharply reduced, resulting in less crumbling of the carbide and finishes of 20 r.m.s. and better. Proper chip flow design reduces recutting, giving 2 to 3 times more production between resharpening.

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**Conventional method:
68 spars in $37\frac{1}{2}$ hrs.**



**With Helicarb Cutters:
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Interlocking Side
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Stagger-toothed
Side Mills

Sonnet Tool and Mfg. Co.

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For more data circle 369 on Reader Service Card

modern equipment at work

*Materials handling . . . metallizing . . .
tooling . . . turning . . . grinding . . . broach-
ing . . . pressing . . . clamping*

Saving Space and Time with Narrow Aisle Electric Trucks

WHEN warehouse operators a few years ago were introduced to a new type of electric truck which was so designed that it could be easily manipulated with full loads in six-foot wide aisles, the possibility of widespread use throughout manufacturing industries was immediately predicted. As the prediction prov-

ed correct, acceptance by industries of the narrow aisle truck prompted the manufacturer, The Raymond Corporation of Greene, New York, to design several types of attachments featuring close quarter operation.

Figure 1 shows a view of the Raymond narrow aisle electric truck that is equipped with a high lift platform, especially designed for transporting and stacking skids and boxes. This high lift platform truck has



Fig. 1—Savings up to 30 per cent in storage space have been made with trucks designed for narrow aisle operation.

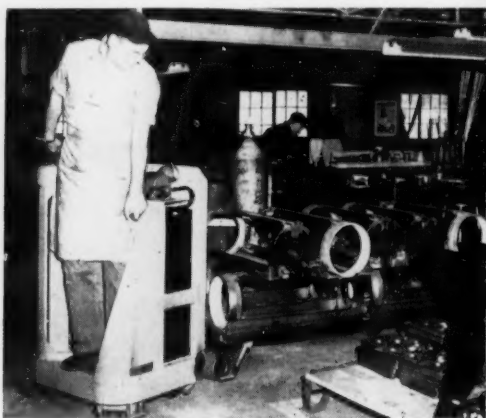


Fig. 2—The narrow aisle tractor is available with a special hitch for handling semi-live skids.

also been designed with an auxiliary push-pull device for handling dies. Dies can be quickly pulled from presses transported and placed in storage racks and a new die taken and installed in the press all in a matter of minutes.

The narrow aisle electric truck has also been made available with a hydraulic coupling which engages and lifts the towing end of a semi-live skid, as shown in Figure 2. Further, a hinged bottom dump box designed to supply small parts to production workers can also be handled by means of a special attachment built into the truck.

A recently added feature to the narrow aisle truck is an adjustable load fork arrangement which allows an operator to move the truck up to a load, extend the fork to engage and lift the load and then retract it for transportation. The principle advantage of this model truck being that it can be used to conveniently handle a wide variety of skids, pallets and bins of different sizes.

Other special attachments have been designed for various operations. For example, a barrel grab has been designed for picking up drums, also side clamps for handling boxes, bales and other bulky objects.

For more data circle 4 on Reader Service Card

★ ★ ★

Automatic Cycle Grinder Increases Production of Valve Plugs

AN outstanding production record has been achieved by a prominent manufacturer of valves who recently installed a "Grindmatic" automatic

cycle grinder in his shop for the purpose of grinding the shank and adjacent surface of a heavy duty valve plug. The Grindmatic is a product of The Standard Electrical Tool Company, 2488 River Road, Cincinnati 4, Ohio. Previously requiring five minutes to grind the OD of the shank only, the new machine, as shown in Fig. 1, provides for the grinding of both shank and adjacent surface completely in 35 seconds.

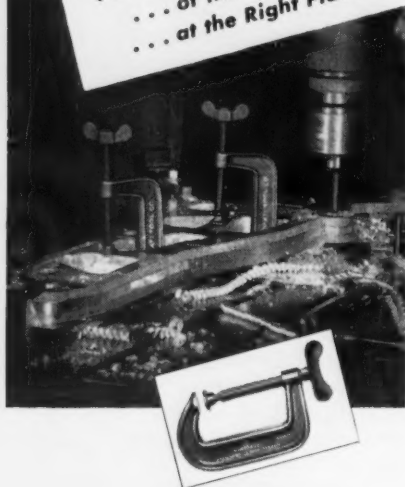
Figure 2 shows a view of the valve plugs beneath a schematic drawing which illustrates the surfaces to be ground and also a view illustrating the angle at which the grinding wheel is brought into contact with the surfaces to be ground. At the right is shown a transparent view of the work spindle holder, with workpiece in position for grinding, and the grinding wheel.

To initiate the automatic cycling



Fig. 1—View of the Grindmatic high production automatic cycle grinder adapted to grinding of valve plugs

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modern equipment at work . . .

of the Grindmatic, the operator merely inserts a valve plug into the work spindle holder and presses a start button. The grinder head, from a rest position, traverses rapidly in a horizontal plane to contact the OD of the valve plug shank. The work holding spindle, with the valve plug in position, revolves simultaneously with the downward traverse of the grinder head thus grinding the OD of the shank. When the wheel reaches the end of its downward travel against the shank, the grinder head automatically traverses horizontally across the flange portion of the valve plug. Upon completion of the horizontal grinding stroke, the grinder head returns vertically to the starting position, at which time the work spindle instantly stops to permit removal of the workpiece.

The application of the Grind-

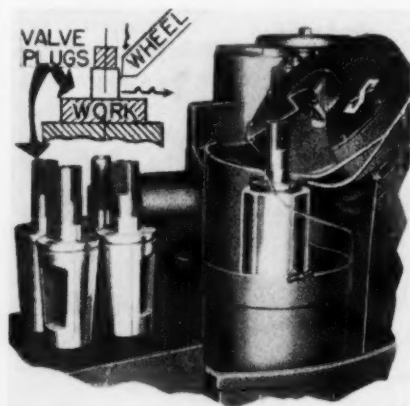
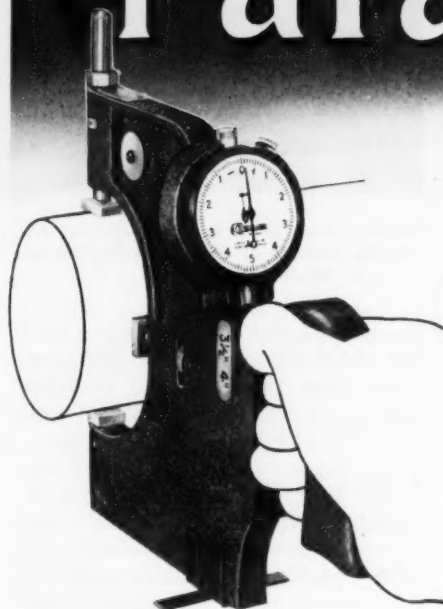


Fig. 2—Schematic closeup of workpiece and grinding wheel setup for Standard "Grindmatic"

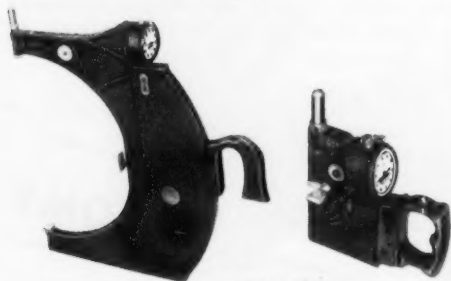


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"L" Type Dial Snap Gage

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RANGE OF SIZES
14" down to 0"

HERE is a modern, heavy-duty dial snap gage, light in weight, rugged in construction, designed for the toughest of long-run jobs.

The "L" Type utilizes Standard's Paralloc pin locking mechanism, which accurately maintains the parallelism of the anvil faces throughout the range of adjustment to a degree heretofore not available in this type of gage.

Eight sizes cover from 0 to 4 inches, each having $\frac{1}{2}$ " range of adjustment. Above 4 and up to 14 inches, each size has 1-inch range. Anvils are faced with tungsten carbide, and backstops are of nylon (except 0" - $\frac{1}{8}$ "). User may choose from a variety of indicator sizes and graduations. Retracting levers and tolerance hands are also available.

Write for complete information.

STANDARD GAGE COMPANY, INC.

POUGHKEEPSIE, N. Y., U. S. A.

For more data circle 371 on Reader Service Card

modern equipment at work . . .

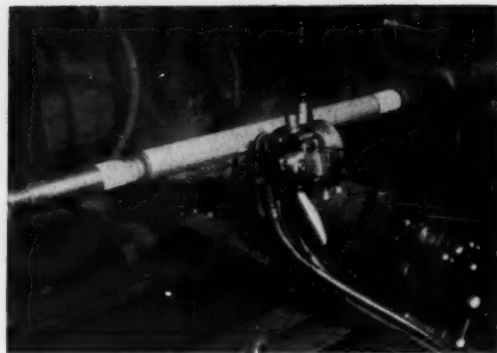
matic high production automatic cycle grinder to this valve plug grinding job provides for the removal of 0.005 in. of stock per pass, with one pass being required. The finish obtained is 35 to 40 micro inch commercial finish using an inverted "V" shaped wheel of specification No. A46-O-V. -

For more data circle 5 on Reader Service Card

★ ★ ★

Metallizing Increases Pump Rod Service Life

A large oil company in Pennsylvania had considerable trouble with pump rods in a 16 by 7 by 14-inch steam pump used for pumping crude oil "bottoms," the non-volatile matter remaining after vaporization of crude oil. Operating conditions for the rods are unusually severe, the "bottoms" containing grit, sand, dirt and other foreign matter. The pump was first put in service some two years ago and the original cold-drawn steel rod lasted just 48 hours.



Rod for steam pump being metallized with material supplied by Metallizing Engineering Co., Inc., Westbury, New York

It was replaced by a hardened steel rod which did little better. The company then tried sprayed stainless and found that the metallized rods would last for four weeks in 24-hour-a-day service. The company also found that the shaft could be re-metallized three times before it had to be scrapped because of limitations of the packing ring adjustment due to reduced shaft dimension. That meant a total life of twelve weeks per metallized shaft, against 48 hours per original shaft.

★ ★ ★ ★ ★



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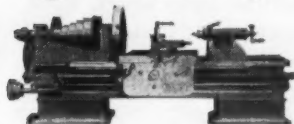
In machine shop and foundry clear away chips, dust, dirt and surplus material quickly . . . AND SAVE through low initial cost, superior performance, low maintenance. Air-O-chek air guns are of simple design, sturdy construction and are easy to use.

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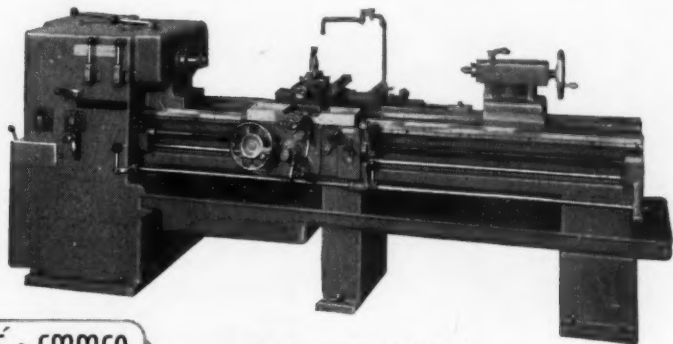
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looked like this!

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modern equipment at work . . .

After using the foregoing method with its own metallizing equipment for two years, the company called in the local machine shop which does considerable contract metallizing and is frequently asked by this oil company to handle special jobs too big to be ground or machined on the equipment in its own shops. The job shop metallized one rod with Metco-Weld H and the other with molybdenum; both were placed in service on the duplex pump at the same time. Over nine weeks later both rods were still in service 24 hours a day. The rod with the Metco-Weld H showed some wear, but the molyb-

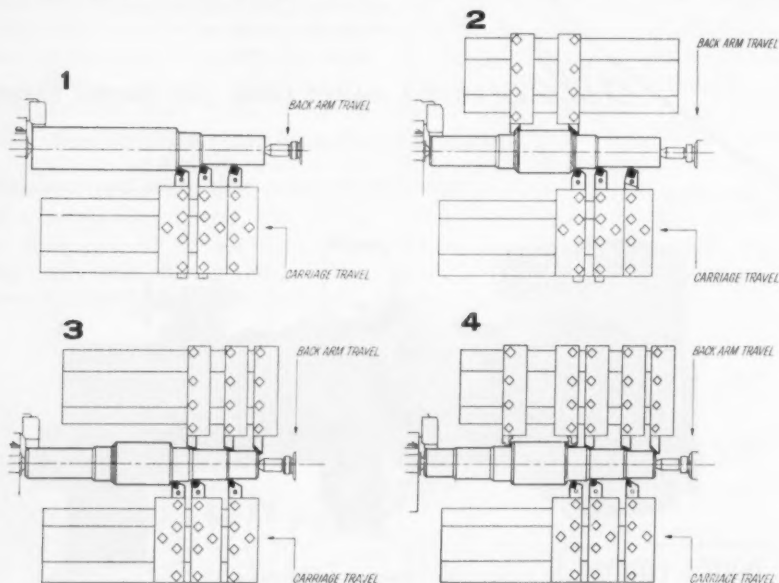
denum rod was found to be in excellent condition.

For more data circle 6 on Reader Service Card

★ ★ ★

Band-Type Carbide Insert Holders Reduce Steel Shaft Machining Costs

CONVERTING to mechanically held carbide insert tool holders for rough turning of heavy duty steel axle shafts on only two machines has cut tool costs \$13,550 per year for a large builder of road machinery. Output per tool grind increased from 30 to 100, an improvement of 333 per cent, when Wesson band-



Four setups used to machine heavy duty steel axle shafts using Wesson band-type Multicuts and Wessonmetal carbide Grade WH. Tool

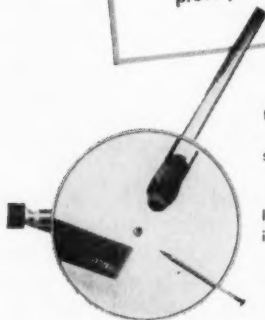
numbering is from right to left beginning with the machine carriage at the bottom of each setup.



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YOU who use small gears, (to 6" O.D. of the gear blank) can improve the performance of your product, through increased gear precision, without sacrifice of gear production.

YOU who use small, fine pitch, precision gears can increase your gear production without sacrifice of gear accuracy, or improve your gear accuracy without sacrifice of gear production.



The Hamilton Precision Gear Hobber, the hobber with a "reserve of accuracy," regularly holds work spindle and hob spindle runout to less than .0002", workspindle and tailstock spindle alignment to less than .0002", and this workmanship is maintained throughout the machine.



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Hamilton Tool

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PERFECT
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For more data circle 375 on Reader Service Card

modern equipment at work . . .

type Multicuts designed specifically for facing, plunge feed turning and chamfering operations replaced the tools formerly used.

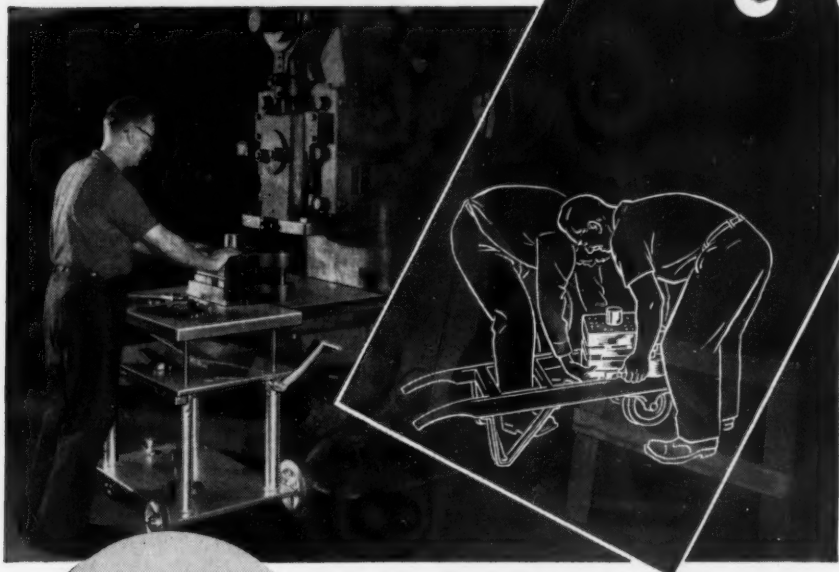
Average depth of cut on all setups is $\frac{1}{4}$ inch with a feed of 0.012 inch and speed of 550 feet per minute. Roughing operation No. 1, performed on the first machine, consists of the first rough turning of the oil seal, bearing and gear diameter. In this first setup, three Multicut holders enter the cut simultaneously with tool No. 1 entering the cut at the gear end of the shaft. Tool No. 3 plunge cuts on the gear diameter and turns to a shoulder on the wheel diameter.

THE SHAFT is then removed and placed in adjacent machine No. 2 where the same turning operations are performed on the opposite end of the shaft. In addition, two holders mounted on a back slide feed in to chamfer the edges of the wheel diameter.

Before proceeding with the third and fourth operations, approximately 500 shafts are machined on the two machines. Tool setups are then changed for the two final roughing operations using setups No. 3 and No. 4. Setup No. 3 consists of final roughing of the gear diameter. Tool No. 2 rough turns the step diameter on which a spacer is placed to hold an oil seal bearing on the roller bearing diameter. Final roughing of this diameter is also performed at this station. Opposing these tools on this station are three chamfering tools which feed in and chamfer all three diameters.

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Hamilton Tool
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For more data circle 376 on Reader Service Card

modern equipment at work . . .

In the final roughing operation in setup No. 4, the turning operations are repeated on the opposite end of the shaft. However, two additional holders in this setup straddle turn an undercut on the wheel diameter for the oil seal. A total of seven pounds of stock is removed from the forging during all four operations.

For more data circle 7 on Reader Service Card

★ ★ ★

Automatic Grinders Finish Pump Rotors

PROBLEMS encountered in producing power steering pumps at a relatively low cost were the basis for the unique automatic grinder shown in Fig. 1, which was developed by

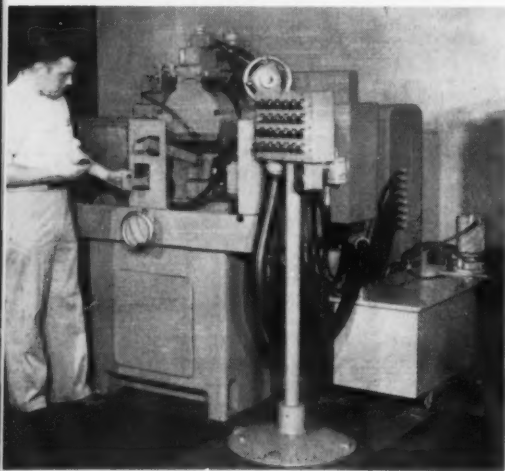


Fig. 1—This unique grinder incorporates automatic fixturing to handle rotors used in vane-type pumps for automotive power steering and power braking.

The DoAll Co., Des Plaines, Ill. The grinder utilizes the basic DoAll grinder design but incorporates automatic fixturing to handle the rotors used in vane-type pumps for automotive power steering and power braking. Twelve slots in the rotor hold the vanes, as illustrated in Fig. 2. The quality of fit and finish is important to pump efficiency, making a lapped finish desirable.

THE ROTORS are manufactured of oil hardening tool steel and, prior to the grinding operation, the slots are milled, the rotor is hardened to 61-62 Rockwell "C" and the rotor faces are lapped to achieve proper part thickness and finish. The slots, then finished on the grinder, are held to 0.078 inch plus 0.0005, minus 0.0000, with a resulting surface finish of 5 to 10 micro-inches r.m.s. Rotors are hopper-fed to the grinding wheel and each slot is in turn indexed and "located" so that its exact center is aligned precisely under the center of the wheel face. In making its rapid plunge to finish the slot, the wheel therefore grinds off exactly equal amounts from both walls. In this manner, pressure and wear on both sides of the wheel are equalized. This affords better control of wheel and consequently of slot dimension. Spacing of the slots during the preceding milling operation is therefore not critical. When the twelve rotor slots have been ground, the finished part is ejected.

An automatic diamond wheel dresser dresses the wheel after the twelve slots of each rotor have been ground and also lowers the column to compensate for wheel depth lost in dressing, as depth of slot must be

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There is no way under the sun to do small, precision tapping with "production" speed, satisfactory tap life and acceptable accuracy, other than to use a tool designed for the specific purpose.

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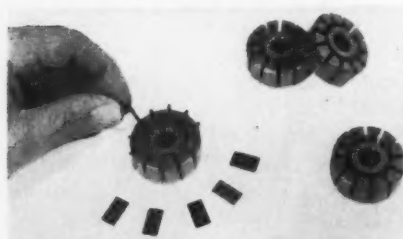


Fig. 2—Close-up view of the rotors finished on automatic grinder shown in Fig. 1.

maintained. The result is 1000 slots ground per hour on the machine.

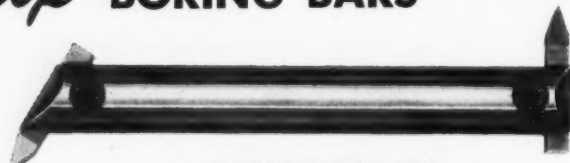
The temperature of the grinding coolant also affects slot dimension and each of the 12 slots of a rotor could vary in proportion to the length of time the rotor was immer-

sed in coolant. This factor is corrected through the use of heat exchangers in the coolant system which keep the coolant approximately at room temperature; i.e., the temperature of the rotors before grinding.

A secondary dressing operation is incorporated by which a new wheel is trued to the desired thickness. Lubrication is automatic on both grinding and dressing operations. A 5 h.p. motor drives the grinding wheel and a 1½ h.p. motor supplies the hydraulic power for loading, indexing and ejecting. The electric and hydraulic circuits are designed according to J.I.C. standards and are interlocked to insure safe operation.

The small rectangular vanes used in the rotors of the automotive steering and braking pumps also require

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Length In	7	8	9	11	13	18	23
Cutter In	1/8 Rd.	1/8 Rd.	1/8 Sq.	1/4 Sq.	1/4 Sq.	3/8 Sq.	1/2 Sq.
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Length In	3	4	5	7	8	10
Cutter In	1/8 Rd.	1/8 Rd.	1/8 Sq.	1/4 Sq.	1/4 Sq.	1/4 Sq.
Price Each	1.25	1.35	2.20	2.50	2.60	2.80

BREAK OFF ON SCORE, AS REQUIRED

1-6" Length—1/8 Dia. H.S.S. Tool Bit Stock—Hardened—each	95¢
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Round Tool Bits Furnished in 1-A, 2-A, 1-B and 2-B—All Others Square. 1 Hexagon Wrench Furnished with Each Bar.	
Price of Square H.S.S. Cutter Bits.	1/8x1 .20 1/4x1 1/4 .30 1/2x1 1/2 .40 3/4x1 1/2 .65

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8T3—Cap. 1/8"—3/8";

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March, 1955

MODERN MACHINE SHOP 169

modern equipment at work . . .

a fine finish to assure pump efficiency. In manufacture, all flat surfaces are lapped to achieve the desired size and finish except for one edge which requires a radius to serve as the contacting edge to the stationary cam ring of the pump. The vanes are ground en masse on standard DoAll grinders adapted for automatic operation with standard automatic attachments. A DoAll Model D-10 grinder, as shown in Fig. 3, is used for forming the radii on the pump vanes because of its large table capacity (10 by 30 inches) which permitted permanent crush-dressing setups while allowing ample room for work. A special fixture used in conjunction with the magnetic chuck holds 312 of the tiny vanes arranged in rows with spacers inserted between the rows. The wheel is crush-dressed to a profile which will impart the desired contour to the edge of the vanes and, since a radius is being ground on the vane, the form on the wheel is in the nature of a complementary indentation. There are several rows of indentations to match the number of rows of vanes in the fixture.

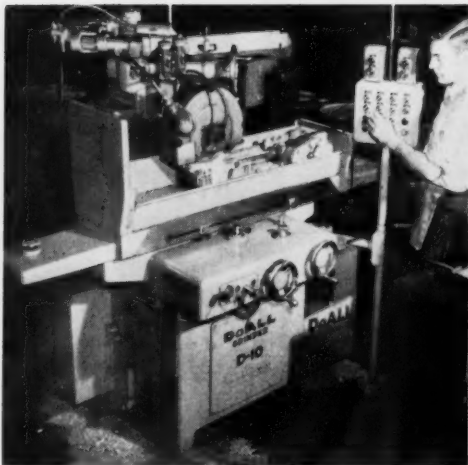


Fig. 3—Standard DoAll D-10 surface grinder equipped with "automatic downfeed" for grinding radii on rectangular pump vanes.

Once started on this automatic cycle, the grinder, arranged for "automatic downfeed," will continue to lower the grinding wheel in desired increments to the limit established by an adjustable stop. Downfeed increment is adjustable from 0.0002 to 0.080 inch and can be arranged to take place at one or both ends of the table stroke. While one chuck load is being ground, another is loaded by the operator who is not required



Monarch Precision SHAPLANE Radius Tools

Illustration shows convex cutter for $\frac{1}{4}$ " to $2\frac{1}{2}$ " balls.

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Range $\frac{1}{2}$ " to 3" for concave Radii. Also heavy duty models for radii to 6" on planers, etc.

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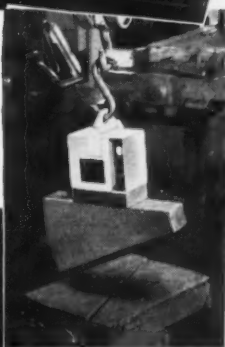
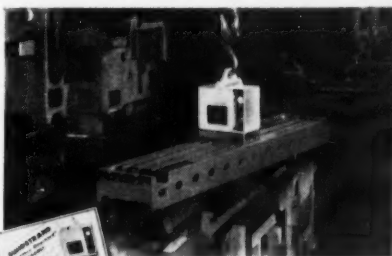
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Left, milling machine table being lowered into position on machine base.

Above, odd shaped parts are easily handled with Sundstrand Lift Magnet.



FREE DATA Write for complete information on this new efficient "Battery Operated" lift magnet. Ask for bulletin 553-M.



SUNDSTRAND Magnetic Products Co.

Division of Sundstrand Machine Tool Co.
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modern equipment at work . . .

to be in constant attendance at the machine. The production rate in this operation is four chuck loads or 1248 vanes per hour.

For more data circle 8 on Reader Service Card

★ ★ ★

High Production Automatic Lathe Used for Short Runs of Parts

IN the shop of the Gisholt Machine Co., Madison, Wis., a No. 12 hydraulic automatic lathe is used for short runs of various component

parts used in other Gisholt machines despite the fact that the lathe is basically a high production machine. This particular machine is a single spindle, automatic lathe with hydraulic controls and a wide range of spindle speeds. It will handle various classes of work, with a chuck, on an arbor, with fixtures or with a tailstock and work driver for between-centers machining. With this versatile machine, it is possible to economically arrange tooling for production runs as low as 25 units, machining the workpieces at high speed, and then changing the tooling to another job.

FIGURE 1 shows the variety of workpieces that are machined on the No. 12 lathe. Experience has shown that change-over time for setup of a new job is a very minor factor compared to the greatly accelerated floor-to-floor time made possible by the high speed operation of this automatic machine. An example of the machining speeds possible may be seen in Fig. 2 where a cone gear sleeve has all exterior diameters finish turned prior to grinding by means of a total of ten tools—five on the front carriage and five on the rear independent slide. Floor-to-floor time for this piece is 1.6 minutes.

One of the principal advantages of a machine of this type is the wide variety of tooling that can be mounted on the front carriage or the rear independent slide. The standard machine can be given added versatility by the addition of accessories such as an auxiliary overhead slide which can be used for additional or final facing, chamfering or grooving op-



Fig. 1—The variety of workpieces shown in the foreground is machined at high production rates at Gisholt Machine Co., Madison, Wis. Production runs as low as 25 pieces are handled on the No. 12 hydraulic automatic lathe shown in the background.

GRINDING TIME CUT 50%

**New Rotor D-4S Air Grinder
pays for itself in 12 weeks**

Job: Grinding defects in holes of castings with cone wheel (size $2\frac{1}{4}" \times 3\frac{1}{2}" \times \frac{3}{8}"$). Formerly used 3600 rpm electric grinder (3 phase, 220v.). Job took 8 minutes—too slow.

Solution: Rotor Application Engineer suggested changing to Rotor D-4S Cone Grinder—speed 8500 rpm.

Results: Saves 4 minutes per casting; doubles output. With 50% use factor, savings paid for new Rotor Grinder in 12 weeks. Wheels last longer. Tool is lighter (only 8½ lbs.); easier to handle. No tool stalling—even when crowded in hole.

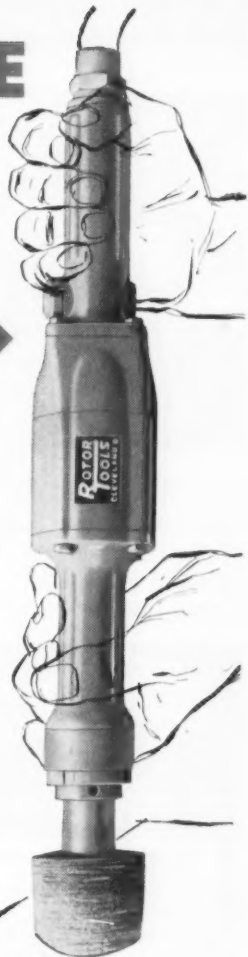
Get the Rotor Engineer on *your* portable tool jobs to save *you* money!

After 12 weeks,
it's pure
savings!



APPLICATION

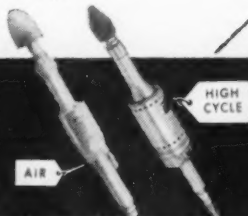
Rotor D-4 Air Grinders are available with straight or grip handle at 8500 rpm for cone wheels and 4" elastic wheels and at 6000 rpm for cone wheels, 6" elastic wheels and 4" vitrified wheels.



ASK FOR BULLETIN 43

THE **ROTOR TOOL** CO.
CLEVELAND, OHIO

UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS



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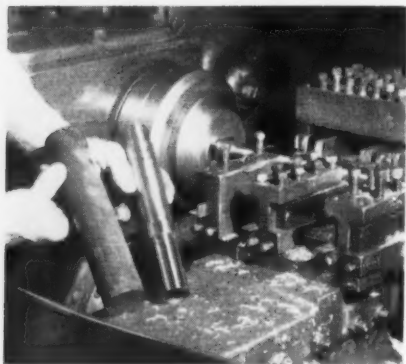


Fig. 2—This cone gear sleeve is machined on the No. 12 hydraulic lathe in a floor-to-floor time of 1.6 minutes.

erations. These machines can be tooled for long runs on single parts,

medium runs on a group of similar parts or short runs on a wide variety of parts.

For more data circle 9 on Reader Service Card

★ ★ ★

Broaching Splines in Gears

AN interesting and unique combination of automation and broaching has been added to the production facilities of one of the country's largest automobile producers. A development of the Colonial Broach Company, Detroit, this automated broaching setup broaches the splines in two different models of a differential side gear at a total rate for both gears of 800 per hour.

Gears are fed to four, side-by-side broaching stations by means of a continuous chain loading conveyor

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carrying 144 individual work-holding fixtures mounted four abreast. Conveyor travel begins at a convenient height for manual loading and continues up at a steep angle until it reaches the broaching level where the path of the fixtures level off horizontally to accommodate the broaching and broach return strokes. A



Broaching two separate models of a differential side gear, four abreast, on an automated Colonial broaching machine at the rate of 800 parts per hour. Parts rest in 144 individual fixtures mounted on a chain-type conveyor.

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Internal ground holes to insure straightness.

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standard Colonial RU 15-48 pull-up type broaching machine was adapted to this interesting broaching operation.

A complete cycle consists of: (1) indexing four gears into broaching position, (2) broaching the splines, (3) indexing the fixtures for broach

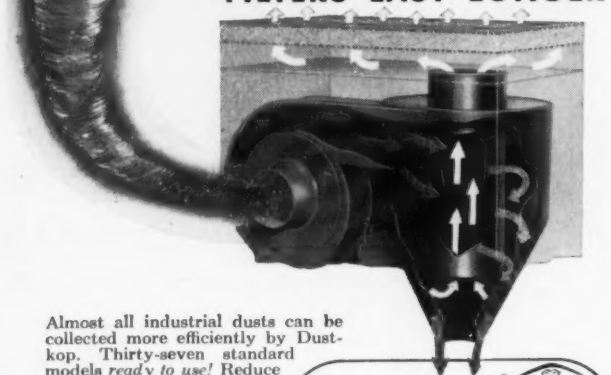
return, and (4) returning the four broaches through the gaps between work-holding fixtures. A cycle requires only 18 seconds. Small cams on the backs of the fixtures actuate the limit switches controlling the cycle sequence.

As the conveyor indexes past the broaching station, the broached parts are carried over the top of the conveyor travel where they start on

the downward path. At this point, the gears drop out of the fixtures through two separate chutes in each side of the machine. This simple, gravity-type system of unloading allows the operator to make a continuous check of individual broach operation. The conveyor is indexed hydraulically. To insure positive indexing, a second hydraulic cylinder locks each group of fixtures in place for broaching. Forward and reversing clutches eliminate any backlash or override during the indexing motion.

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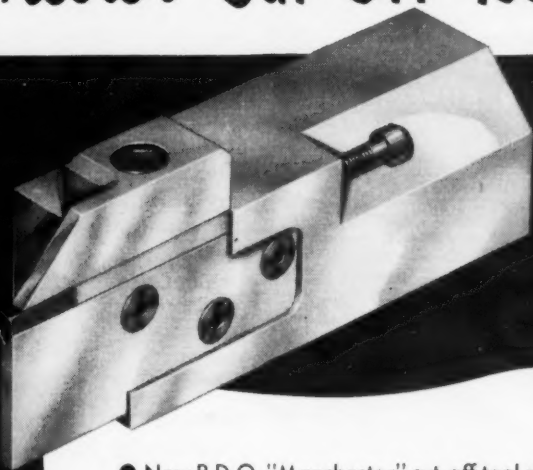


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Tools are available for turret lathes, engine lathes, automatics and cut-off machines... Write for literature and specifications covering ALL the new "Manchester" tool features.



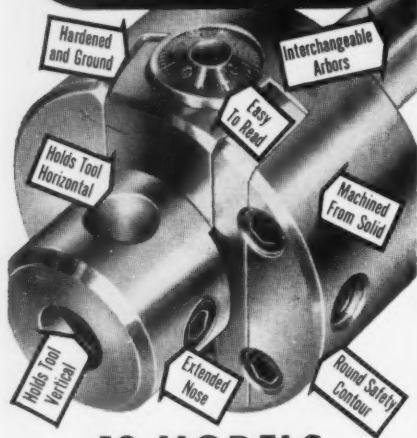
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More Flynn Boring Heads are in use today than any other make because their quality and many design features that make them easier to use and longer lived appeals to machinists.

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It is interesting to note that no clamping fixtures are required. Stationary hold-down bars above the broaching station keep each gear seated in its fixture as the broach is drawn through the hole. The two gears being different hub depths, diameters, and spline sizes. One gear requires a 16-tooth involute spline with a P.D. of 1.1562 inches; the other gear requires a 10-tooth involute spline with a P.D. of 1.125 inches. Production is kept separate by using the two right-hand conveyor rows for one gear model, and the left-hand rows for the other gear model.

For more data circle 10 on Reader Service Card

★ ★ ★

Press Setup for Steering Knuckle Production

TWO products manufactured by Air-Hydraulics, Inc., Jackson, Mich., are combined in the production setup shown herewith, designed for a "big 3" car manufacturer. Used to press together two parts of a steering knuckle, this setup has increased production from 1200 pieces per hour to more than 1800.

An 8-station 15-inch diameter Model 1405 Air-Hydraulics index table was tooled up and mounted on a C-300 5½-ton press. An electrical circuit synchronizes the action of the press and table and makes operation fully automatic. The press can be operated when the table is locked in position. The table indexes only on the return stroke of the press.



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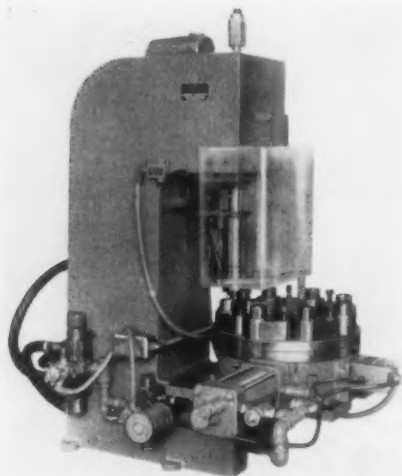
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Setup used by car manufacturer for pressing together two parts of a steering knuckle

In production, the operator places the pieces on the fixture in front of the transparent guard where there is no danger of injury. The parts are then indexed into position and pressed together. Later, the assembly is removed by a mechanical hand and chuted into a container.

For more data circle 11 on Reader Service Card

★ ★ ★

Power Vise Solves Clamping Problems at Hills-McCanna

A NEW power vise installed by the Hills-McCanna Company of Chicago has eliminated a number of production snags caused by manual clamping of castings on a finish grinding job operation. Made by the

Wilton Tool Mfg. Co., Chicago, the power vise, known as the Wilt-O-Matic, is activated by air and has a booster that multiplies air pressure and converts it into hydraulic gripping force. The operator can preset the vise to the exact pressure needed to hold castings firmly without damaging the metal. The operator also can turn workpieces in the vise quickly and easily by controlling the jaws with the foot pedal and moving the casting with his free hand.

Results of using the power vise are said to include a 10 per cent reduction in clamping time, easier and less fatiguing working conditions, and the end of slippage problems.

For more data circle 12 on Reader Service Card



Operator at Hills-McCanna Company is shown finish grinding a workpiece held in air powered hydraulic vise.



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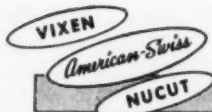
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ideas from readers

FOUR time-saving devices for the man
in the shop

Self-Locating Center Punch Trammel

By C. H. WINTERBURN

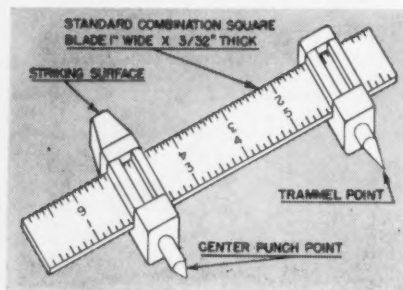
THE drawing herewith shows a self-locating center punch trammel designed by the writer for rapid and accurate layout work where center punched locations are required. The device is believed to be especially adaptable to sheet metal layout work, either for template or part fabrication assignments; also, for use in the toolmaker's kit for multi-hole layouts where jig borer accuracy is not necessary.

Designed for use on a standard

combination square plate or scale, the device can be readily and accurately set to the desired location. The center punch and trammel points are on identical center lines with their respective indicators which rest on the edge of the scale or blade, thereby making the proper setting easy to locate and properly maintain.

The punch and trammel are made of tool steel, each consisting of a body and two front supports which are welded together as shown. After welding, the punch and trammel are hardened in accordance with standard shop practice and the specifications of the particular material used.

A number of different styles of points, both center punch and trammel, can be interchanged, if desired, the only restricting factor being the construction of the indicator end which must conform to the design as shown. A hermaphrodite point can be used for the trammel head to permit easy and accurate positioning of center punched locations from the edge of the workpiece, or other deviations to suit the shop or work requirements.



Drawing of self-locating center punch trammel

Adjustable Plug Gage for Large Holes

By ROGER ISETTS

IN the accompanying sketch, the author presents a design of plug gage which has been found particularly useful in gaging the inside diameters of short-run bored parts. Adaptable for checking bores of various diameters the gage comprises a square piece of cold-rolled steel, *A*, approximately $\frac{3}{4}$ inch thick by 3 inches long which is drilled with a clearance hole, *B*, for two pairs of headless set screws, *C*, one pair being located in a cross-drilled and tapped hole in one end of the block *A* and the other pair in a hole cross-drilled and tapped in the opposite end of the block at right angles to the first cross-drilled and tapped hole. On the end of each screw is brazed a hardened ball bearing, *D*.

In use, the screws are merely adjusted in or out to the desired dimensions. One pair of screws can be

set to the low limit of the bore and the other pair of screws to the high limit for go and no-go gaging operations. After the screws have been adjusted to the proper setting, jam nuts, *E*, are tightened to prevent movement of the screws.

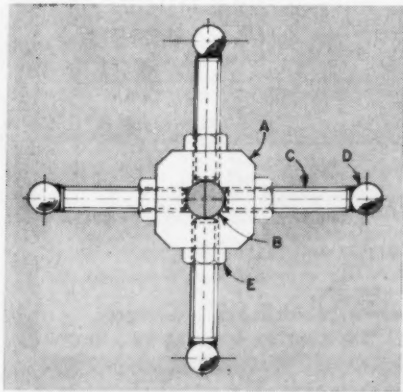
★ ★ ★

Adjustable Grinding Wheel Dresser

By HAROLD E. HALL

FOR dressing grinding wheels to any angle desired with accuracy and considerable speed, Temco Aircraft Corp., Dallas, Tex., has adapted a Hardinge lathe compound (or head) to the job. The device can be mounted between centers on cylindrical and thread grinders, or it can be used on surface grinders.

In devising the adjustable wheel dresser, the writer mounted the Hardinge compound — with attached degree maker — on a $4\frac{1}{2} \times 6\frac{1}{2}$ -in.



Sketch of adjustable plug gage for large holes



Wheel dresser mounted between centers

ideas from readers . . .

block of $\frac{1}{2}$ -in. steel with a T-slot, and then drilled a center hole at each end of the block, 90 degrees to the slot. Thus, when the lathe compound is mounted between centers in a grinder, the zero point on the degree marker is opposite the edge of the grinding wheel and perpendicular to its axis.

The diamond holder on the compound can be swiveled, lined up and locked at any one of the 360-degree marks on the degree marker. Thus, if the compound is set 14 degrees to the right of zero on the marker, for example, the diamond will cut a precise 14-degree angle on the left side of the grinding wheel. The diamond

holder has a lateral travel of $\frac{3}{4}$ in. in a dovetail slide. This travel governs the width of the cut made on a grinding wheel.

★ ★ ★

Tap and Die Holder Set for Small Taps and Dies

By H. L. CAMPBELL

THE accompanying drawing shows a tap and die holder set for small taps and dies which was designed by the writer for use in his own shop. Each holder in this combination set is used with the same guide bar on which it slides to the work. These holders are used to guide the tap or die accurately when threading either in a lathe or in a drill press.

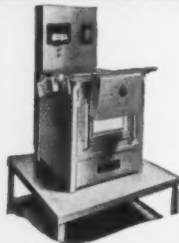
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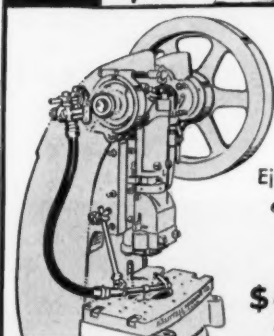
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BY AIR

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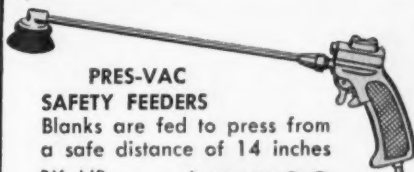
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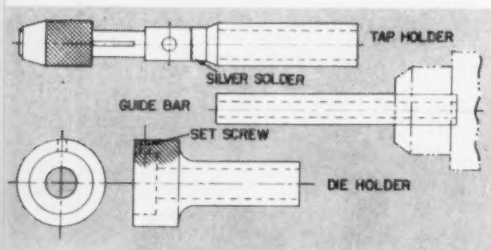


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ideas from readers . . .



Drawing of tap and die holder set for small taps and dies

In making the tap holder, a hand tap chuck is silver soldered to a steel or brass sleeve. The die holder is turned from a piece of steel or

brass $1\frac{1}{2}$ inches in diameter. The guide bar is a piece of cold finished steel $\frac{1}{2}$ inch in diameter with a hole $\frac{1}{4}$ inch in diameter through the center. The guide bar is gripped in a chuck which is placed in the tailstock of a lathe or in a drill press. The tap holder or the die holder is placed on the guide bar and is turned by hand, with the work mounted in the headstock of the lathe or on the table of the drill press.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

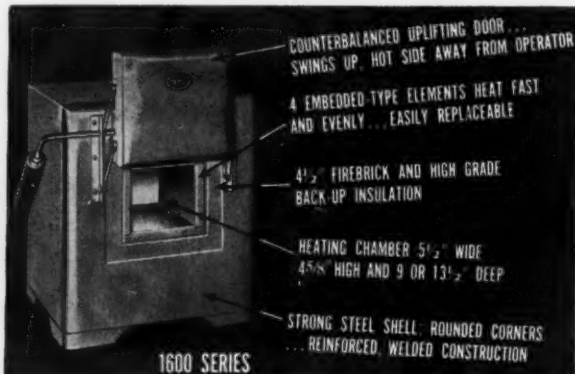
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on any product mentioned
in this issue — use the

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★ ★ ★ ★ ★

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**Temco bench-
type furnace**



Step up production, cut costs with Temco electric furnaces for heat treating dies, parts, tools, etc. Model illustrated above one of eight convenient sizes available with either electronic or manual temperature controls. Economical, easy



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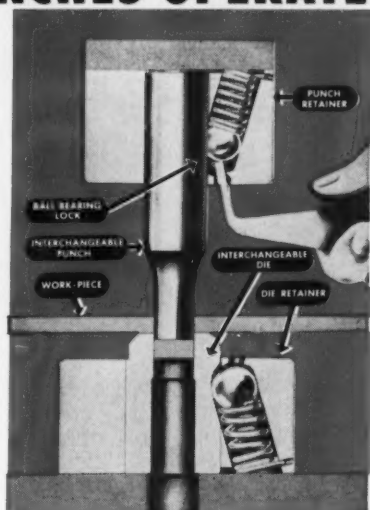
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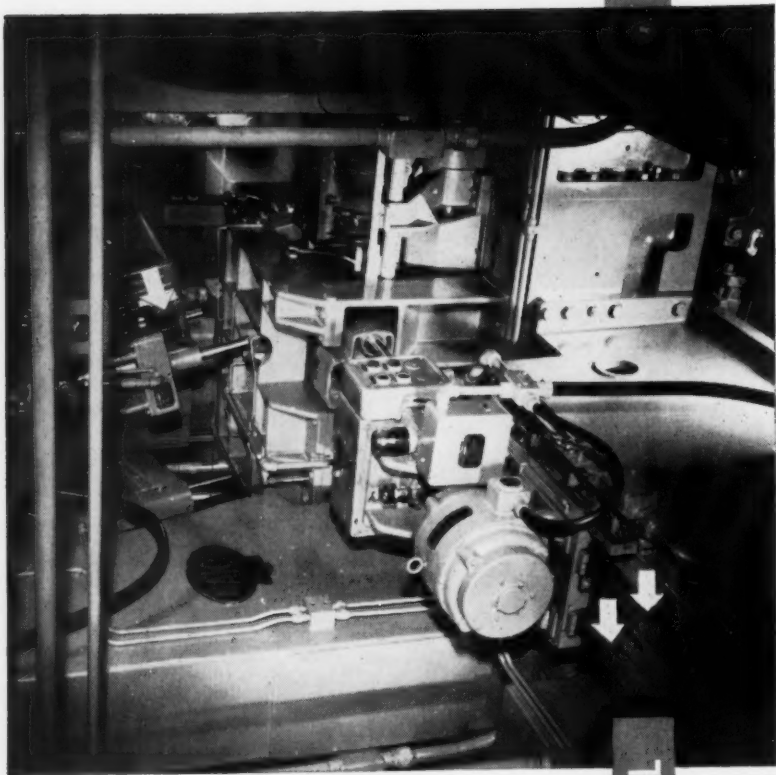
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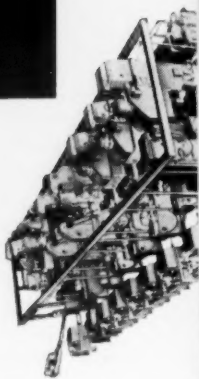
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LUDLUM

SARATOGA TOOL STEEL



Ludlum Saratoga was used for the steel ways (note arrows, above) of this giant unit, illustrated at left in a bird's-eye view reduced to miniature size.



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This concise four-page folder gives all needed handling and shop treatment details on Saratoga. Included is certified laboratory information on physical characteristics, and complete data on forging, annealing, hardening, tempering, etc. *Ask for your copy.*

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news of the industry

*New plants . . . company anniversaries . . .
new appointments . . . company mergers
. . . personnel changes . . . special
honors and awards*

SUPER TOOL OPENS NEW PLANT AT ELK RAPIDS, MICHIGAN

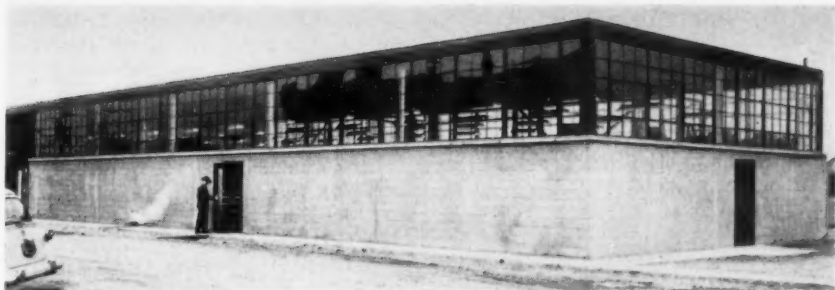
The opening of a new plant at Elk Rapids, Michigan, has been announced by Super Tool Co., Detroit. Construction of the additional 20,000 square foot facility expands the 27-year-old company's production of standard carbide drills, reamers, milling cutters, saws, lathe tools and other metalcutting tools, as well as its line of masonry and glass drills. The transfer of production of these standard items

to the northern Michigan plant and the increase in output speed up service to standard carbide tool customers and dealers and increase manufacturing of special carbide tools at the Detroit plant.

In addition, Super Tool has a recently-built factory branch and warehouse at Glendale, California, and warehouses at New York and Chicago. The line of carbide tools is sold by industrial supply houses across the nation, and Super Tool representatives offer design and engineering service.



New Elk Rapids, Michigan, metal cutting tool plant of Super Tool Company



New Laboratory of Chemical Division, Michigan Chrome & Chemical Co., Detroit, Michigan

MICHIGAN CHROME & CHEMICAL OPENS NEW LABORATORY

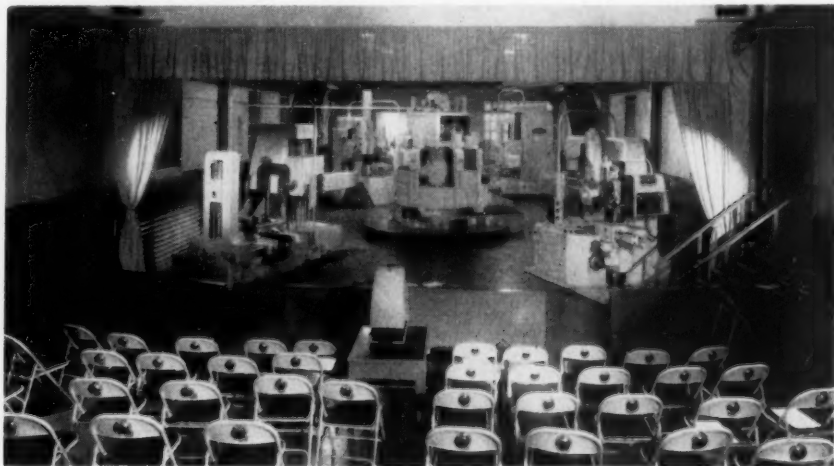
The opening of a new and larger chemical laboratory to serve its Chemical Division has been announced by Michigan Chrome & Chemical Co., Detroit, Mich. The new laboratory is equipped with the latest modern equipment necessary for the development of new Miccro products and Plastisols, maintenance of high manufacturing standards and for the assistance to customers in working out their coating and

production problems. The laboratory staff of seven chemists, headed by Dr. Robert M. Lacy, will use the 4,000 square feet of floor space in the new laboratory to good advantage for chemical development and control.

★ ★ ★

BULLARD ANNOUNCES OPENING OF NEW EXHIBIT BUILDING

The Bullard Co., Bridgeport, Conn., has announced the opening of an exhibit building which has a capacity for



View of The Bullard Company's exhibit building with 150-person seating capacity

news of the industry . . .

seating 150 persons. Products on display are powered for demonstration. The accompanying illustration shows a view looking onto the exhibit floor. In the foreground (left to right) is a 3-Inch Model 75 Horizontal Boring Mill, a Type L Mult-Au-Matic and a 26-Inch Vertical Turret Lathe with Man-Au-Trol attachment. In the background (left to right) is a 46-Inch Model 75 Vertical Turret Lathe and a 5-Inch Model 75 Horizontal Boring Mill. These machines have been introduced to the metalworking industry during the past several months.

★ ★ ★

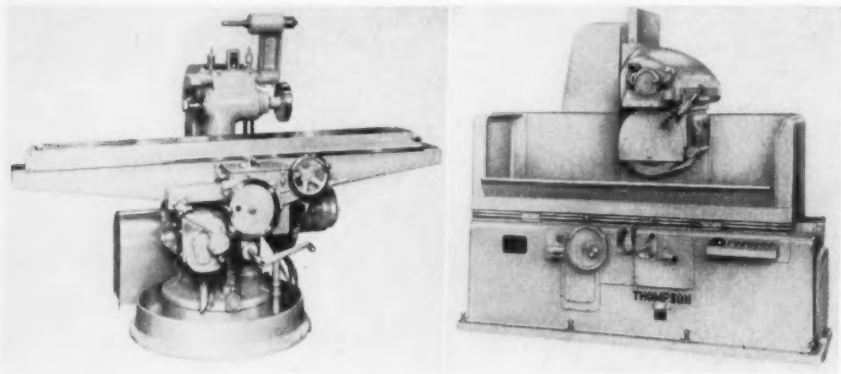
THOMPSON GRINDER COMPANY CELEBRATES 50TH ANNIVERSARY

The Thompson Grinder Company, one of the world's largest manufacturers of machine tools in its field, is now celebrating its 50th anniversary. At this time in the year 1905, the company was founded in Springfield, Ohio, by Christian Baldenhofer. The firm was incorporated the same year and

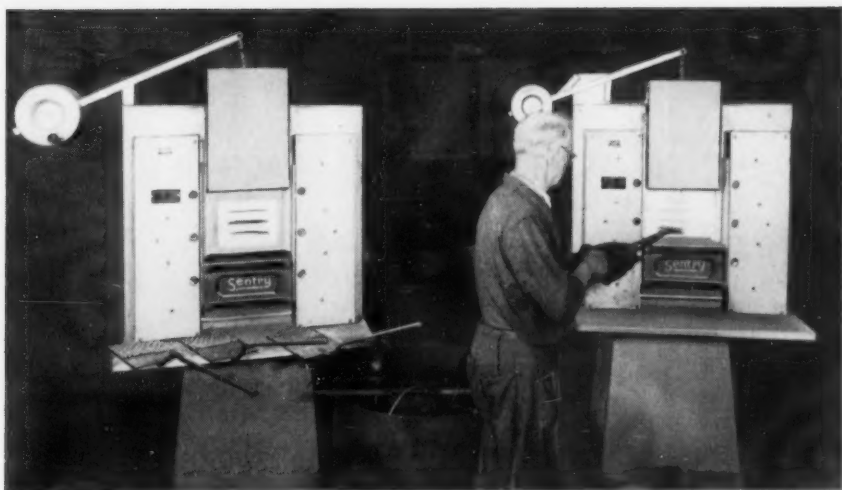
produced its first grinder, known as the Thompson Universal Grinder. For the next 23 years, production of this small general utility grinder and jobbing work comprised the bulk of Thompson production. However, in 1929, work started on the design of surface grinders.

It was during this early development that Christian Baldenhofer, then president, played a large part in the conception of crush grinding that was to become a famous patented Thompson grinding method. Thompson Truforming was announced in the fall of 1943, and the Thompson Type B and Type C Truform Grinders became in great demand in war production, especially for high production of buckets and blades of new jet engines. From the 23,000 feet of floor space in the 1930's, the company expanded until after 1945 there were 75,000 square feet of floor space, and an average of 300 workers now are responsible for Thompson production.

Controlled coolant through the wheel was developed by Thompson in 1946. Then followed developments such as the Hydrail Grinder, making possible grinding of highly accurate and fine finishes of large machine tools. What



Old and new designs—(left) the original Thompson Universal Grinder and (right) the new Thompson Type C Heavy-Duty Surface Grinder



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Sentry Furnaces and The
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Method.

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(Left to right) William G. Baldenhofer, Ralph Baldenhofer, John C. Wilson, Mrs. Ruth Andrews and Fred T. Wilson

is claimed to be the largest surface grinder in the world, a Thompson Hydrail Grinder, was installed last year at the Monarch Machine Tool Company. A line of vertical spindle grinders, known as Hydrovert Grinders, with sliding column was developed for grinding multi-level or wide flat surfaces. Dual rotary grinders were recently developed for high production of such parts as automatic transmission gears, circular saws and housing castings. As a result, Thompson now offers industry a complete range of types and sizes of surface, contour and broad grinders.

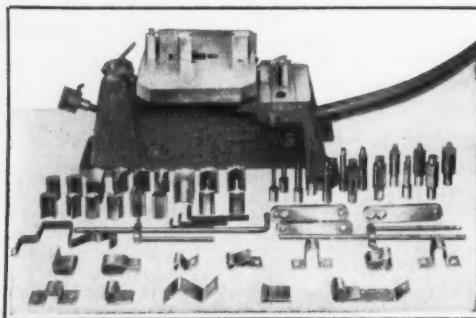
Christian Baldenhofer headed his company until his death in 1953. His eldest son, William G. Baldenhofer,

was elected president and general manager following his death. Other officers of the company include Ralph Baldenhofer, vice president and treasurer; John C. Wilson, vice president in charge of sales and engineering; Mrs. Ruth Andrews, secretary; and Fred T. Wilson, assistant secretary.

★ ★ ★

SPS OPENS \$1,000,000 PLATING PLANT

Standard Pressed Steel Co., Jenkintown, Pa., has announced the opening of its recently completed million-dollar plating plant to precision job plating from outside firms. While SPS expects



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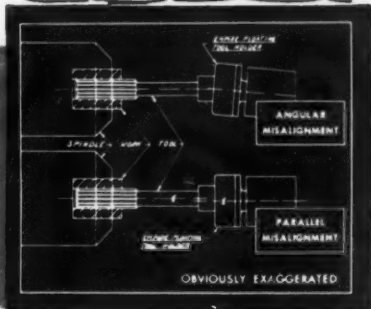
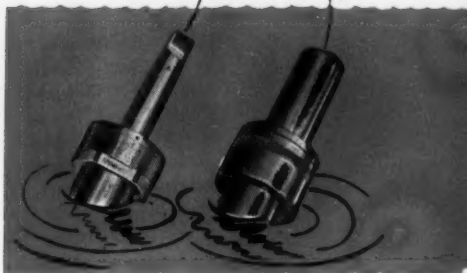
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and describes the four bender models.

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TAP HOLDERS**

And we do mean float!

These floating reamer and tap holders compensate for both out-of-parallel and angular misalignment and permit tap or reamer to float freely—in and out—and will not freeze under tension caused by drag.

By referring to the drawing you will note that the sleeve and shank float independently of each other—achieving a free and easy movement—a unique engineering design not found in any other floating tool.

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- that corrects for both parallel and angular misalignment
- that will not strip threads when tap is pulled out
- that permits adjustments of float to threading—right or left hand.

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news of the industry . . .

most of the job plating business to come from neighboring firms, it will accept orders from anywhere in the country as long as a reasonable profit can be made. The company has set up a special sales and manufacturing organization within its new modern plant to handle precision plating orders from other companies. The plating plant was built primarily to electroplate and surface-treat SPS products. But with ex-

cess capacity engineered into its nine separate plating lines, SPS decided to go after outside work but only precision, close-tolerance work.

The plating plant, part of a \$10,000,-000 expansion which doubled the floor space at the 50-year-old company, is said to have two of the largest small-parts plating lines in the country, one a 60-foot automatic barrel line and the other a 70-foot unit on which pieces are plated on racks. These two machines are controlled through automatic instrumentation. Daily capacity of the

plating operation is 30,000 lb. of smaller products and 100,000 pieces on racks. Products can be plated to any specified thickness ranging from a flash coat to 0.020 inch. Tolerances can be held to 0.0001 inch, even on threaded pieces. Included among the various kinds of plating and surface treatment available at SPS are cadmium, zinc, silver, nickel, chrome, copper, tin, nickel phosphide, black oxide, phosphating and Parkerizing.

Standard Pressed Steel has prepared at 32-page, picture- and-text booklet describing its plating facilities and discussing the history and some of the technical

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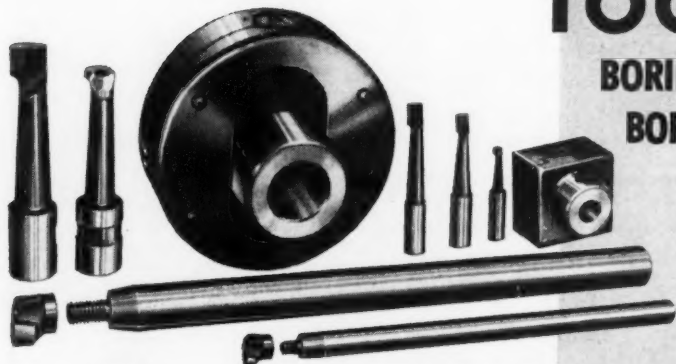
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news of the industry . . .

aspects of plating. The booklet, entitled "Precision Plating, a Product and a Service," can be obtained by request on company letterhead addressed to Standard Pressed Steel Co., Box 556, Jenkintown, Pennsylvania.

★ ★ ★

NORTON NAMES FIVE NEW OFFICERS AND A DIRECTOR

Stockholders and directors of Norton Co., Worcester, Mass., named five

new officers and one new director at their 70th annual meeting. Two retirements, one a director and the other an officer, were also announced. Edwin E. McConnell was elected treasurer, succeeding William J. Magee who has retired. Mr. McConnell has been controller since 1941 and a Norton director since 1951. William H. Perks was appointed controller to succeed Mr. McConnell and was elected a director replacing Mr. Magee on the board. Mr. Perks was also appointed to the executive committee. He has been assistant controller since 1948.

Robert D. Lawson was elected to the

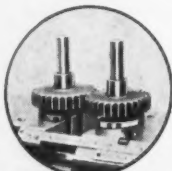
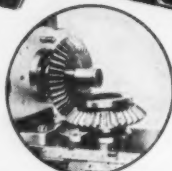
PARKSON GEAR TESTERS

*The Rolling Test
is Practical
Common Sense*



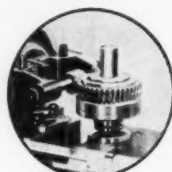
◀ The MODEL B shown
takes in SPUR
WORM
SPIRAL and
BEVEL GEARS
from 1/4" to
9" Center Distance

- Indicates RUN-OUT, CENTER DISTANCE by 1/1000 vernier, BACKLASH, TOOTH JUMP, etc.
- It catches the error directly in the shop where the gears are cut.



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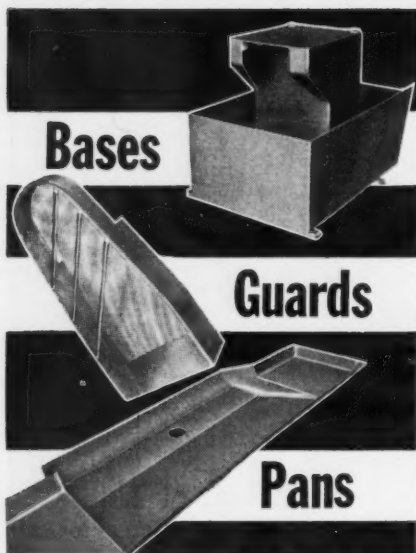
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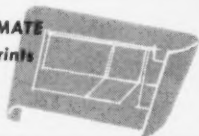
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news of the industry . . .

new position of vice president and sales manager for the company's Grinding Machine Division. He has been sales manager since 1951. Richard Prouty became secretary of the company, succeeding Malcolm N. Pilsworth who has retired. Mr. Prouty has been assistant to the treasurer since 1951 and assistant secretary since 1953. Fairman C. Cowan was elected clerk of the corporation, succeeding Mr. Pilsworth. He was also appointed assistant secretary and has replaced Mr. Pilsworth as general counsel. George N. Jeppson was re-elected chairman of the board, and Milton P. Higgins was re-elected president by the directors.

The stockholders re-elected the following directors: George N. Jeppson,



(Upper left) Edwin E. McConnell, (upper right) William J. Magee, (lower left) William H. Perks and (lower right) Robert D. Lawson

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March, 1955

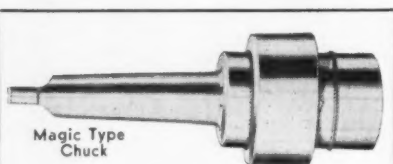
MODERN MACHINE SHOP 203

news of the industry . . .

Clarence W. Daniels, Mr. Higgins, Andrew B. Holmstrom, Ralph M. Johnson, Mr. Gow, Mr. Schacht, John Jeppson, William R. Moore, Lewis S. Greenleaf, Jr., Mr. McConnell, Mr. Hicks, Mr. Kelso, Howard J. Daly, Wallace L. Howe and John M. Cook. In addition to Mr. Perks, those ap-

pointed to the executive committee were Mr. Daniels, Mr. Gow, Mr. Higgins, Mr. Holmstrom, George Jeppson, John Jeppson, Mr. Johnson, Mr. McConnell, Mr. Kelso, Mr. Hicks, Mr. Howe and Mr. Moore.

Norton directors appointed the following officers: John Jeppson, vice president in charge of manufacturing, Abrasive Division; Mr. Johnson, vice president in charge of sales, Abrasive Division; Mr. Moore, vice president in charge of national accounts; Mr. Hicks, vice president and general manager, Grinding Machine Division; Mr. Kelso, vice president in charge of foreign operations; Mr. Howe, vice president in charge of research and development; Mr. Lawson, vice president and sales manager, Grinding Machine Division.



Magic Type
Chuck

THE COLLIS MAGIC-TYPE CHUCKS

Reduce production costs with Collis Magic Chucks. Now tools can be changed without stopping or slowing down the spindle. Boring, counter boring, drilling, reaming, tapping, etc., can be performed practically continuously.

Let our 40 years of manufacturing experience help your customers select the proper equipment for the job.

"Call Collis For Service"

THE COLLIS CO.

Dept. A, Clinton, Iowa

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★ ★ ★

CLEVELAND CRANE CONSTRUCTS NEW SHIPPING AND RECEIVING BUILDING

The construction of a new \$500,000 shipping and receiving building has been started by The Cleveland Crane & Engineering Co., Wickliffe, Ohio, manufacturer of heavy overhead traveling cranes, overhead tramrail materials handling systems, metalcutting power shears and various types of heavy presses. Measuring 132 by 160 feet in size, the new building will be modern in every respect and equipped

AT LAST!

A Low-Priced Dial Type Indicator

Has 2 contacts 1/32" threaded within 1/8". Double Faced. Reads front and back. Two Crystals. Double faced dial indicator complete with plated holder including 1/32" and 1/8" contacts —

Black Penetrate . . . \$8.95

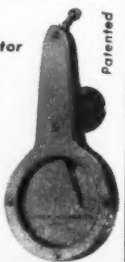
No. 4 Superior Magnetic Base

and Indicator Holder. . . \$8.95

Thousands of satisfied customers!

SUPERIOR INDICATOR CO.

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standard for comparison
...and with high speed steels
the standard is REX

Living up to a standard for comparison isn't easy. That's why Crucible lavishes special care on the manufacture of REX® high speed steels . . . to keep REX the *standard* wherever high speed steels are used—as it has been for over half a century.

It's easy to *prove* the superiority of REX. Use it on the job . . . check its size, structure, response to heat treatment, fine tool performance. You'll agree with thousands of other users—you *can't find a high speed steel to outperform REX.*

Remember, REX is made only by Crucible. So call for REX at any Crucible warehouse, or for quick mill delivery. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.*

Visit us at Booth 350
 Western Metal Show
 Los Angeles
 Mar. 28-Apr. 1

CRUCIBLE

first name in special purpose steels

Crucible Steel Company of America

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news of the industry . . .

with the latest handling facilities to expedite the movement of incoming materials and outgoing heavy machinery. Spur tracks from both the New York Central and Nickel Plate Railroads will be run into the building. Special consideration has been given to the handling of materials on and off the hundreds of trucks which serve the

plant every month so that they can leave in the fastest possible time. The building is expected to be completed by sometime in May, 1955.

★ ★ ★

RUDOLPH F. ONSRUD RECEIVES HONOR FROM A.S.M.E.

Rudolph F. Onsrud, president of Onsrud Machine Works, Chicago, and

Onsrud Cutter Mfg. Co., Libertyville, Ill., has been elected to the grade of Fellow of the American Society of Mechanical Engineers, one of the highest honors attainable in the engineering field. To qualify as a nominee to the grade of Fellow, one must be an engineer with acknowledged engineering attainment, have 25 years of active practice in the profession or teaching of engineering and have been a mem-

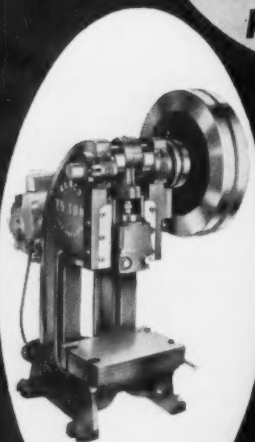


Rudolph F. Onsrud

KENCO

1½ TO 15 TON

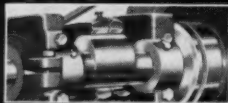
PUNCH PRESSES



PRECISION-BUILT FOR FAST, TROUBLE-FREE PRODUCTION

Here at last is a complete line of small punch presses built to big press standards. You get rugged construction throughout... minimum need for adjustments... minimum downtime... capacity far beyond the ratings... steady, economical production.

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Trouble-free crankshaft has no weakening slots... eliminates driving dog breakage. One-piece, alloy steel construction.



Flywheel driving plate is hardened and ground, assuring long wear and positive drive—a quality feature exclusive with KENCO presses.

KENCO MANUFACTURING CO.

Mfrs. of Precision Machinery and Accessories

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haskins

FLEXIBLE SHAFT EQUIPMENT

WITH
Power
THAT KEEPS ITS
distance

... gives jobs like these
quality with quantity!



Choice of Mountings
Suspended,
Bench or Pedestal

Whatever the job — grinding, sanding, buffing, polishing, filing, brushing or deburring — Haskins equipment handles it easily, quickly, economically and profitably. Haskins equipment provides plenty of out-of-the-way power for even the most sustained operations . . . with a minimum of operator fatigue. That's why, for over 36 years now, the nation's finest and largest (and most profit-conscious) metal working plants rely on Haskins as standard equipment.

Haskins makes a complete range of models with drives, speeds, tools and attachments. There's one made to fit your exact requirements. For additional information write:

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2647 W. Harrison St.
Chicago 12, Illinois

news of the industry . . .

ber of the A.S.M.E. for 13 years.

Mr. Onsrud, a well-known inventor and industrialist, holds numerous patents, having developed a number of high speed automatic and semi-automatic machine tools used in aircraft production, as well as other industrial equipment. He joined Onsrud Machine Works in 1920 and became president in 1940.

In 1922 and 1923, he designed and manufactured what is said to be the first non-metallic ball spacer for high speed precision ball bearings. Prior to World War II, he took charge of 46 separate operations in connection with setting up the U. S. Government arsenal in Springfield, Massachusetts, for the M-1 Garand rifle, including plant layout, special machinery and tooling. Among his other inventions are

a vacuum pulley for high speed spindles, lubricating systems for high speed spindles and machines for sheet tapering as required in jet aircraft.

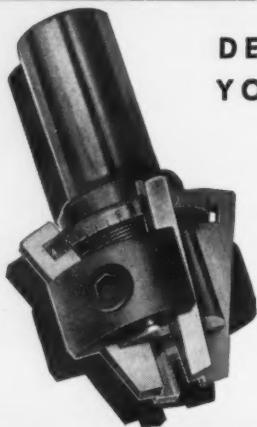
★ ★ ★

\$12,000 MACHINE TOOL DESIGN AWARD PROGRAM

Dr. E. E. Dreese, chairman of the board of trustees of the James F. Lincoln Arc Welding Foundation, has announced the sponsorship by the foundation of a \$12,000 Machine Tool Design Award Program. Awards will be made for papers describing the use of arc welding in machine tool design.

Dr. Dreese, who is also head of the Department of Electrical Engineering at the Ohio State University, states, "The foundation's trustees believe such an award program can be of service in stimulating creative engineering. The program is being sponsored this

KUTMORE ADJUSTABLE HOLLOW MILLS



DESIGNED FOR ALL YOUR HOLLOW MILLWORK

- ANY COMBINATION OF . . . TURNING . . . TAPERING . . . FACING . . . CHAMFERING . . . TREPPANNING IN **ONE PASS.**

- EXCLUSIVE **MICROMETER** ADJUSTMENT FEATURE FOR RAPID SET-UP.

- CUTTING CAPACITIES FROM 1/32" TO 2" DIAMETER IN STANDARD STOCK. IMMEDIATE DELIVERY.

WRITE FOR CATALOGUE No. 20 MM

OUR ENGINEERING DEPARTMENT IS AT YOUR DISPOSAL ON YOUR HOLLOW MILL PROBLEMS

CARL WIRTH & SON, INC. 1625 CLINTON AVE. NO. ROCHESTER 5, N. Y.

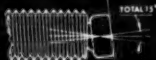
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Here's the secret to
positive clamping...
freedom from marring!

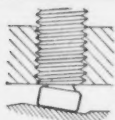


the New Vlier

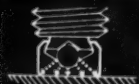
SCREW-BALL CLAMPS!



Ball-bearing construction insures frictionless, automatic angle adjustment and rotation; pad swivels freely in all directions up to $7\frac{1}{2}^\circ$ from the centerline!



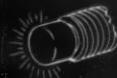
Pad seats firmly on work surface within angular range!



Force distributed equally to pad face. Conical seat distributes force equally in all directions; insures easy alignment in angular applications; greater freedom of motion.



Pad inserts from top of threaded hole or from bottom for easy installation!



Large pad area. Pad is machined from the solid, not counter-bored or relieved; has greater strength plus freedom from distortion!

NO MORE EXPENSIVE, CUSTOM-MADE SWIVEL PADS. 17 size variations; $\frac{1}{2}$ " O.D. up. N.C. threads; class 2 fit.

LOW COST... Saves hundreds of dollars annually in toolmaker's time!

NO MARRING. Rotation of pad ceases at first touch against the work! Soft seat saves surfaces!

HEX SOCKET HEAD... for easy hex key adjustments!

BLACK AS THE ACE OF SPADES! Completely rust proofed end to end!

KEEP VLIER SCREW-BALLS IN STOCK FOR INSTANT USE—SAVE YOUR TOOLMAKER'S TIME!

Ask your Vlier Distributor for an assortment of sizes today!



VLIER ENGINEERING
INCORPORATED

MONEY-SAVING TOOLING SPECIALTIES FOR EVERY REQUIREMENT!



TORQUE THUMB SCREWS—Apply accurate, controlled end pressures; eliminate distortion to the workpiece. 4 models; 19 sizes!



VLIER SPRING PLUNGERS—For use wherever accurate, positive spring loads are needed! 4 models; 40 sizes!



VLIER SPRING STOPS—Provide end pressures in fixtures when wall sections are not available. Two models: 14 and 32 lbs. end pressure.



VLIER TOGGLE PADS—Assure solid clamping of parts with uneven or off-angle surfaces. 5 sizes; fit almost any clamp.



VLIER FIXTURE KEYS—New 5-Way Key fits every standard mill table slot. 3-Way model also available.

Write for your complete catalog of Vlier products today! It's free!

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news of the industry . . .

year when many machine tool builders will be examining their designs for improvements and new developments to announce at the machine tool show in September." Dr. Dreese further states that the experience of many machinery builders who have modernized their machines through welded design indicates that the contribution of weld-

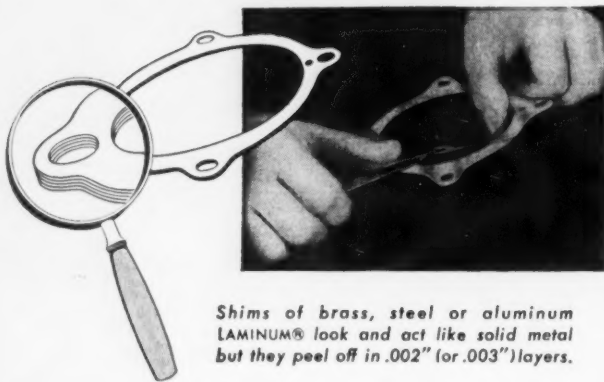
ing in reducing costs and improving performance can be greatly multiplied. It is hoped by the Foundation that the program will help in carrying on this forward progress of the machine tool industry.

The \$12,000 Machine Tool Design Award Program is open to all persons who are or have been engaged in the design or making of metal cutting or metal forming machine tools. A total of 15 awards will be made with a top

award of \$3,000, other main awards of \$2,500, \$2,000, \$1,500, \$1,000, and 10 awards of \$200 each. Awards will be made to the 15 best papers submitted to the foundation describing the use of arc welding in the design of either a component part or complete machine tool. The tool may be either a metal cutting or metal forming tool as defined by the National Machine Tool Builders' Association. The work or equipment described must have been planned or executed in the period from January 1, 1953, to July 15, 1955. The design may be one that either has been manufactured or one that is planned to be manufactured. It may be either a

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SIMPLY  FOR ADJUSTMENT



Shims of brass, steel or aluminum LAMINUM® look and act like solid metal but they peel off in .002" (or .003") layers.

Laminated shims provide great accuracy with easy, economical machining tolerances. This simple method of spacing adjustment reduces lathe time, eliminates stand-

by machines. Adjustments in thousandths are made right at the job with a penknife. You eliminate the counting, stacking and mixing of ordinary shim procedure.

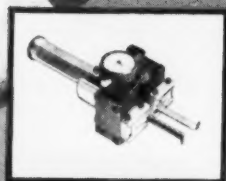
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3303 UNION STREET, GLENBROOK, CONN.

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BRYANT GROOVE GAGE



This Bryant gage checks the diameter and roundness of internal grooves up to 5". Four sets of segments are adjustable to cover the range of standard "O" ring grooves and four different sets are adjustable to cover the range of snap ring grooves. A movable segment actuates the dial indicator which gives direct reading of any variation from basic size. Bryant Chucking Grinder Co., Springfield, Vermont, U. S. A.

news of the industry . . .

redesign or a new design. The program closes July 15, 1955.

The award program is open to all persons in the United States and its possessions who have actually been engaged in the design or manufacture of the equipment described. A single author or a group of authors may submit a paper. A booklet describing the

program and how to participate is available from Lincoln Arc Welding Foundation, Cleveland 17, Ohio.

★ ★ ★

F. L. MEACHAM ELECTED PRESIDENT OF SIMONDS WORDEN WHITE

The Simonds Worden White Co., Dayton, Ohio, has announced that Floran L. Meacham was elected president

and general manager at a recent director's meeting. H. R. Simonds was elected chairman of the board, and Dr. Frank R. Henry was made vice chairman.

Mr. Meacham comes to Simonds Worden White from the Avco Manufacturing Corporation where he served as general works manager in charge of all manufacturing operations of the Crosley Bendix Home Appliance Division.



Floran L. Meacham

**BEST
SEEING
TOOL**

LIGHT AS YOU WANT IT
for Machine Tools, Assembly
and Inspection Benches

**FOSTORIA
LOCALITES**

**FINEST OF ALL
LOCAL LIGHTING**



MODEL 2-MH-700
Overall length 35" **\$7.04** In std.
Each pkg. of 8
Less \$8.80 ea.

Reflector—5" long x 3 3/8" wide x 3" deep. Rotates 360°. Accommodates 100 watt A-21 or 60 watt A-19 lamp.

Arm Joints—New patented tension disc design. Easy, smooth action with only one hand. Available with 1, 2 or 3 arms.

Base—Universal for vertical or horizontal mounting. Also adaptable to outlet boxes. Collet revolves 360°.

Wiring—McGill industrial socket 4101-FL with Levolor switch. 8 ft. POT-32 18-2 heavily insulated oil resistant wiring with molded plug.

Finish—Gray baked enamel. Reflector interior, high temperature White.

WRITE for complete catalog of Localite models for every industrial use.

**THE FOSTORIA PRESSED
STEEL CORPORATION**
Fostoria, Ohio

*Localites available through
wholesalers everywhere*



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New **SIoux** Electric IMPACT WRENCH



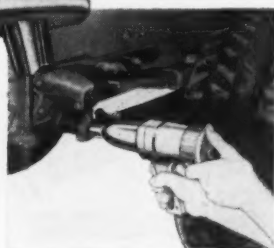
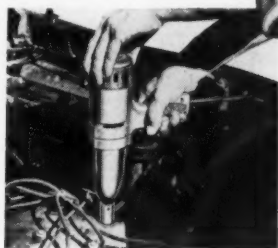
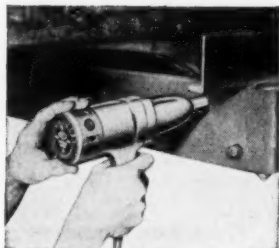
No. 325
only \$99.75
No. 330
only \$127.50

Now you can have the
extra power and performance
of a SIoux Impact Wrench!

In no type of tool is good design
and quality manufacture more
important . . . nowhere will tradi-
tional SIoux dependability and
long life be more apparent and
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with the EXCLUSIVE REVERSE CAP SWITCH LOCK!

Your SIoux Impact Wrench
can't be reversed with the
switch on! This exclusive
design feature eliminates
a common cause of
burned commutator—
brushes, and switch
contacts. It's one of
the reasons SIoux
Impact Wrenches
will last longer!



SPECIFICATIONS

Wrench No.	Capacity Bolt Size	Socket Drive Size	PRICE
325	3/8"-3/4"	1/2" sq.	\$ 99.75
330	3/4"-1 1/4"	1/2" sq.	127.50

Free Speed R or L 2,000 RPM, Both Models; Impacts Per
Minute 2,000, Both Models

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Please send complete information and
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SIoux IMPACT WRENCHES

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GRINDERS • SAWS • IMPACT WRENCHES • VALVE SERVICE EQUIPMENT

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news of the industry . . .

Prior to that, he was vice president and general manager of the Chicago Vitreous Corporation where he started as sales and service manager.

Mr. Meacham becomes the third president of Simonds Worden White in over 80 years of operation, the company having been founded in 1873 and its abrasive division added in 1908. The

company is said to be one of the first manufacturers of bonded abrasive products.

★ ★ ★

**NEW MANAGEMENT MOVES
ALMOND MANUFACTURING
TO CLEVELAND**

The name and certain assets of the T. R. Almond Mfg. Co., Ashburnham, Mass., have been purchased and moved to the Cleveland metropolitan area, Donald M. Pattison, president and general manager of the new company, announced Mr. Pattison was formerly a director and vice president in charge of sales of The Warner & Swasey Company. The new enterprise, now under new management, is chartered as an Ohio corporation and will produce a line of drill chucks, medium-duty three-jaw geared scroll

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SPINDLES OR
WORKHEADS

**RUGGED
CONSTRUCTION**
Plus
DYNAMIC BALANCE
Plus
**PRECISE ENGINEERING
OF STANDARD
SPINDLES**
Equals
**SPECIAL
MACHINE TOOL
PERFECTION!**

PRECISION BELT-DRIVEN
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In nearly 500 American and foreign plants, STANDARD spindles are doing a top production job as modernizing applications on old machines, and in special adaptation for custom jobs.

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IN BOOTH 1023
1955 ASTE WESTERN
INDUSTRIAL EXPOSITION
LOS ANGELES, CAL.
MARCH 14 THRU 18

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Since 1912

the STANDARD electrical tool co.
PRECISION SPINDLES AND MACHINE TOOLS

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Donald M. Pattison

First in performance
for automatic muscle jobs
like these...

T-J

Spacemaker

CYLINDERS

OFF SHELF DELIVERY



- OIL pressure to 750—AIR to 200 P.S.I.
- New Compact Design . . . Saves up to 40% Space
- Proven Performance . . . with Extra High Safety Factor
- Super Cushion Flexible Seals for Air . . . New Self-Aligning Adjustable Oil Cushion
- Hard Chrome Plated Bodies and Piston Rods
- The Only Cylinders with all the Extras as Standard

T-J Spacemaker Cylinders get first call for an ever-widening range of power movement jobs in industry today—because they're so advanced in design . . . so efficient and dependable in performance. Wide selection of styles and capacities. Check your needs now! Send for bulletin SM-454-2. The Tomkins-Johnson Co. Jackson, Mich.

PUSH



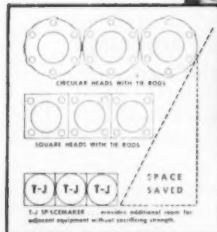
PULL



LIFT



Roller
Lock
Brake
Press
Spin
Turn
Grind
Weld
Lower
Squeeze
Band
Coin
Saw
Tap
Index
Brake
Open
Time
Blank
Cut
Broach
Drill
Sequence
Close
Snub
Form
Pierce
Feed
Mill
Convey
etc.



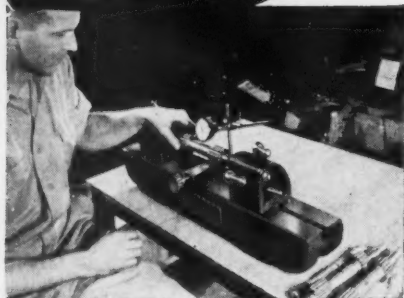
TOMKINS-JOHNSON

PNEUMATIC, AIR AND HYDRAULIC CYLINDERS, CUTTERS, CLAMPERS

Member of the National Fluid Power Association

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Keep a Close Check On Accuracy With SUNDSTRAND Bench Centers



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"One-hand control" over all movable elements leaves the operator's other hand free to control rotation of the part being checked. Either headstock or tailstock can be unclamped, positioned and locked in place with a single hand operating the top lever. Investigate this bench center today.

Complete Range as Follows:

6" x 18"	12" x 48"	24" x 48"
6" x 36"	12" x 60"	24" x 60"
12" x 36"	12" x 72"	24" x 72"

FREE Additional Data

covering complete specifications and additional features is contained in this bulletin. Write for your copy. Ask for data sheet 551.



SUNDSTRAND MACHINE TOOL CO.
2539 Eleventh Street, Rockford, Ill., U.S.A.

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news of the industry . . .

lathe and independent lathe chucks.

The new location of the company is a new, modern, single-story plant on a three-acre site in a rapidly growing industrial section of Willoughby, Ohio, just four miles from the city limits of Cleveland. Directors of the new company, in addition to Mr. Pattison, are Charles M. French, president, Great Lakes Box Company; E. B. Gausby, secretary, The Warner & Swasey Company; Albert L. Ray, president, Gahr Machine Company; and Stanley A. Woleben, vice president, Armstrong-Blum Manufacturing Company.

★ ★ ★

ALVEY-FERGUSON PURCHASES CONVEYOR MANUFACTURING FIRM

The Alvey-Ferguson Co., Cincinnati, Ohio, has announced the acquisition of The Cincinnati Automatic Conveyor Company and the manufacture of its "Trol-e-veyor" lightweight, easily installed overhead conveyors. James A. Gailey, inventor of the "Trol-e-veyor" conveyor and former owner of Cincinnati Automatic Conveyor, has joined the Alvey-Ferguson sales and engineering staff. Mr. Gailey has had wide experience in both sales and product engineering before he developed the "Trol-e-veyor" system.

★ ★ ★

MOTCH & MERRYWEATHER ELECTS NEW OFFICERS

The board of directors of The Motch & Merryweather Machinery Co., Cleveland, Ohio, has announced the election of George E. Merryweather as chairman of the board and secretary, Charles B. Lansing as president, and Clare

3 REASONS **WHY** USERS SPECIFY

SEIBERT MULTIPLE DRILL SPINDLES AND PRODUCTION TOOLS

See Us At Booth 920
ASTE Industrial Exposition
Los Angeles, March 14-18



● Whatever your multiple drill spindle requirements, you'll find at Seibert a complete selection of quality tools designed and built to save you time and money. Investigate the economy of standardizing with Seibert. A large staff of field engineers are prepared to assist you in selecting from a full line of spindles, adaptors, drivers, sleeves, and holders.

1 **PRECISION BUILT** to meet your most exacting tolerance standards. Seibert spindles and tools are made from highest quality alloy steel, hardened and ground for perfect fit and built to withstand the severe shocks of hard use.

2 **MASS PRODUCTION** of standard sizes creates savings that are passed to the user. Most standard items can be promptly delivered from stock. Special requirements can be supplied at near standard prices.

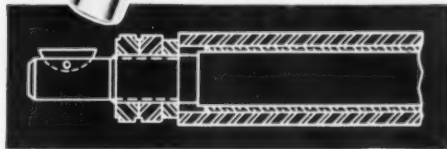
3 **PERSONALIZED SERVICE** and specialization in the manufacture of production holding tools only, assures prompt and efficient handling of your inquiry.



Standard Slip Spindle Assemblies are available in a wide range of sizes ranging from $\frac{1}{8}$ " to 2 $\frac{3}{4}$ " nose diameter.



FREE DATA Write today for Folio 1-50 illustrating and describing the complete line of Seibert Multiple Drill Spindles.



Upper and Lower Drive Assemblies



Pinion Drive Shafts



Universal Joints



Bracket Spindle Assembly



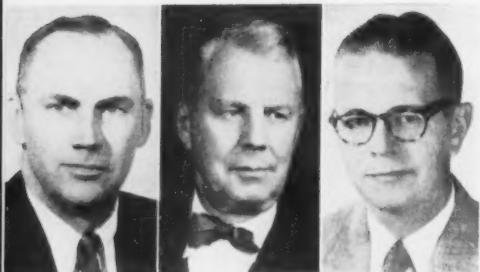
Adaptor



SEIBERT & SON, INC. CHENOA, ILLINOIS

Quality MULTIPLE DRILL SPINDLES AND PRODUCTION TOOLS

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(Left to right) George E. Merryweather, Charles B. Lansing and Clare R. Kubik

R. Kubik as executive vice president and treasurer. Mr. Merryweather will also serve as chairman of the executive committee. Prominent in trade associations, Mr. Merryweather presently

serves on the executive committee of the American Machine Tool Distributors Association and is a member of the Government Relations Committee of the National Machine Tool Builders Association. He also serves as a director of Jack & Heintz and Morrison Products Company, both of Cleveland; Avey Drilling Machine Co., Cincinnati, Ohio; and the American Sip Corporation of New York City.

Mr. Lansing succeeds the late E. Franklin Motch as president of the firm. Mr. Lansing, well known as a consultant engineer, is a fellow of The American Society of Mechanical Engineers. He has served as president of both the National Tile Company and The Ilco Ordnance Company. His directorships include The Lindsay Wire Weaving Company, The Ferry Cap & Set Screw Company, The S-P Manufacturing Company and The Cowles Chemical Company, all of Cleveland;



FOR YOUR POWER PRESS

HIGH PRODUCTION: In your power press the VOGEL TUBE SHEAR cuts any diameter or wall thickness of tubing within range of machine from 1/3 to 1 second per cut.

MINIMUM BURR: Cuts square ends with minimum of burr.

LOW MAINTENANCE: Simplicity of design with few moving parts insures low maintenance. "Set-up" can be done by anyone with very little training.

INTERCHANGEABLE: Die blocks available to cut tubing sizes from 1/8" O.D. to 2" O.D.

AUTOMATIC STOP: Holds lengths to plus or minus .010" cut from any mill lengths of tubing.

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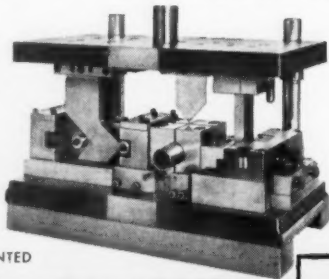
THE VOGEL TUBE CUT-OFF MACHINE

No. 12 VOGEL CUT-OFF MACHINE

Takes tubing up to 1/4" O.D. x 3/32" wall.

No. 2 VOGEL CUT-OFF MACHINE

Takes tubing up to 2" O.D. x 1/8" wall.

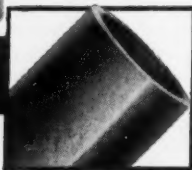


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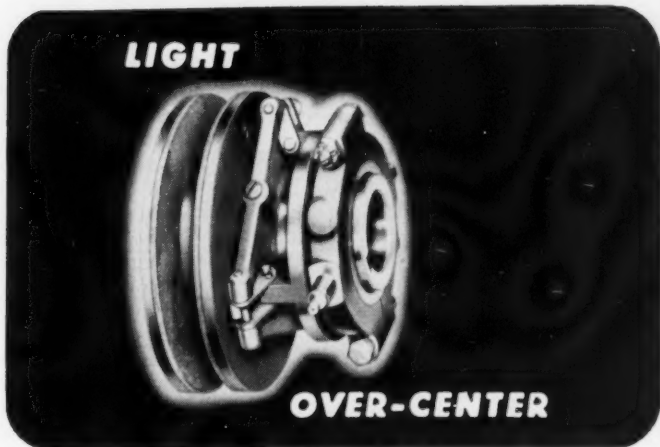
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 - FINE ADJUSTMENT** signs. Is well suited for use
 - ACCURATE BALANCE** with gasoline engines or
 - LONG SERVICE LIFE** motors, in applications within
- its torque rating.

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Shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique applications.

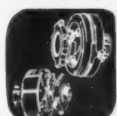
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CLUTCHES

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news of the industry . . .

land Engineering Society and the American Society of Tool Engineers.

★ ★ ★

The Miller Co., Meriden, Conn.; The Automatic Voting Machine Co., Jamestown, N. Y.; and the S. Morgan Smith Co., York, Pennsylvania.

Mr. Kubik was elected a director, as well as executive vice president and treasurer. He is a member of the Cleve-

CARBORUNDUM FORMS NEW OPERATING DIVISION

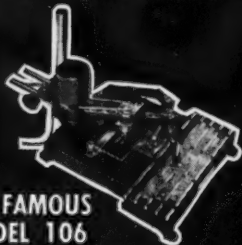
The Carborundum Co., Niagara Falls, N. Y., has announced the establishment of a new operating unit, the

Electro Minerals Division, to manufacture and sell silicon carbide and fused alumina crudes, abrasive grains and related electric furnace products. Joseph S. Imirie, formerly assistant to the president, has been appointed general manager of the new division. George R. Rayner, Jr., formerly special accounts sales manager for the Bonded Products and Grain Division, was made sales manager, and D. George Vanderhoek, manager of the production branch of the functional staff, was named manufacturing manager for the division. Joseph J. Forrester, formerly manager of technical service of the Research & Development Division, will be manager

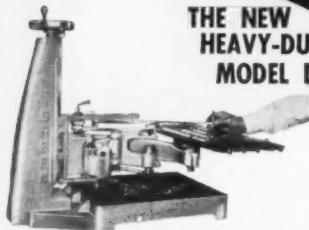
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The three-dimensional bench Model 106 cuts costs — engraves, routs, models and profiles, giving you expert results even by unskilled workers.

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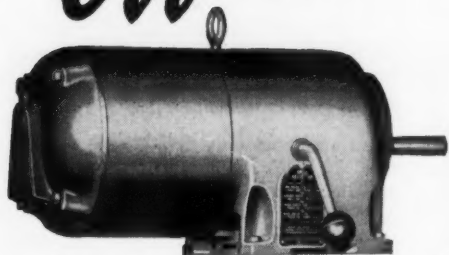
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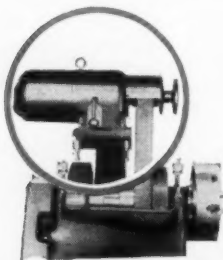
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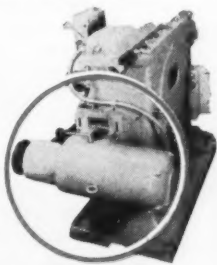
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Why not let our experienced Sales Engineering Staff help solve your motorizing problems—an accurate survey of your requirements involves no obligation.

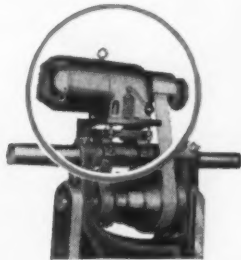
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Coast To Coast Representation
GEARSHIFT DRIVES & MOTORS

THE LIMA ELECTRIC MOTOR COMPANY



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news of the industry . . .

of product engineering, Harold L. Schmidt will be works manager of the Niagara Falls plants of the new division, and Elmer E. Howard will be manager of the Vancouver plant.

According to company officials, the creation of the Electro Minerals Division was a logical step in the company's policy to decentralize and specialize along basic product lines. The large Bonded Products and Grain Division, which formerly encompassed the responsibilities now allocated to the Electro Minerals Division, will be designated The Bonded Abrasives Division and will specialize in the manufacture and sale of grinding wheels, sharpening stones and other bonded abrasives.

The facilities and personnel includ-

ed in the new division are the silicon carbide furnace plant, fused alumina furnace plant, abrasive grain and powder processing facilities, and the storage and auxiliary equipment at Niagara Falls, as well as the silicon carbide furnace and crushing plant in Vancouver, together with all the company's employees at these installations.

★ ★ ★

SUNDSTRAND HYDRAULIC DIVISION HAS NEW NAME AND NEW PLANT

Sundstrand Machine Tool Co., Rockford, Ill., has announced that its Sundstrand Hydraulic Division is now a separate entity with a new home, a new name and its own management, sales, engineering, service and production facilities. The production of fuel units for domestic oil burners, fluid motors,

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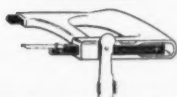
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Makers of Hand and Power Hack Saw Blades, Frames, Metal and Wood Cutting Band Saw Blades and Clemson Lawn Machines.

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news of the industry . . .

stack valves, lubricating pumps and other precision hydraulic products is now in full swing in a new 106,000 square foot plant located at 2210 Harrison Avenue in Rockford, just a few blocks from the former plant. Sundstrand Hydraulic Division was formerly identified by such names as Fuel

Unit Division, Hydraulic Division and Industrial Hydraulic Division. It remains a division of the parent company, but basically will operate as an individual entity.

A. H. Swenson has been appointed manager of the new division. Mr. Swenson has been associated with Sundstrand for 20 years, serving as sales engineer, master mechanic and works manager. C. W. Lang, associated with

the oil heating industry for many years, continues in his capacity as sales manager. F. E. Carlson has been promoted from master mechanic to chief engineer of the division. Manager of manufacturing is R. W. Roper, and G. N. Bookland will continue as purchasing agent.

The new building has been specially designed and equipped for volume production of fuel units and the other precision hydraulic devices. Rows of latest model machine tools form and finish parts to exacting specifications. Unusual facilities include special Sundstrand racks for run-in of equipment, acoustically-treated booths for verifying quietness of operation and preci-

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**Quality-Famous, Heavy Duty
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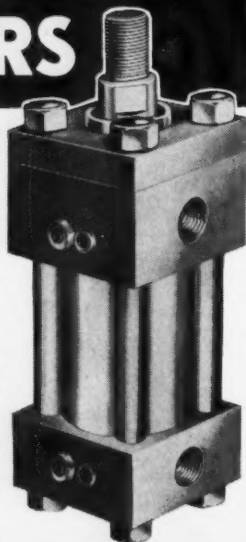
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AIR CYLINDERS, 200 psi, 1½" through 8" bores, strokes up through 36", over 15 popular mountings, cushioned and non-cushioned.

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Larger bores (up through 20" air, 12" hydraulic) and longer strokes (up to 22 feet) available on longer delivery.



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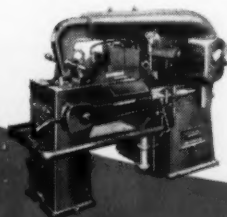


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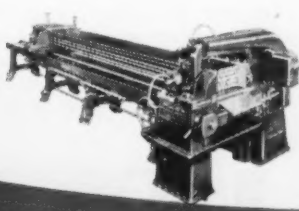
Write us about your metal-cutting needs and catalog of our complete metal-cutting saw line. Address: **RACINE HYDRAULICS & MACHINERY, INC.**, 2070 Albert St., Racine, Wisc.



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AIR GRINDERS

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\$42⁰⁰

IN U.S.A.



Weight 12 ounces;
length 6¾ inches;
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Wheel guard removed
for better illustration.

The RPM's stay up while grinding . . . not only when the grinder runs idle. That means better work—longer wheel life.

High speed grinding with small wheels was a Madison-Kipp development of the late twenties. It was born out of a pressing need in our tool room. Because tool room grinding problems are universal, we believe it will pay you to utilize Kipp grinders in your tool room as generally as we do in our own.

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news of the industry . . .

sion instruments for checking capacity, power consumption, pressure, pulsation and efficiency.

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BAKER ACQUIRES HALL LINE OF VALVE SEAT GRINDING MACHINES

Baker Brothers, Inc., Toledo, Ohio, has acquired certain assets of the Hall automotive equipment line of the Waterbury Tool Division of Vickers, Incorporated. As a result, production of Hall valve seat grinding machines and allied equipment has been transferred from Waterbury, Connecticut, to Toledo where it will be carried on under the name Hall-Toledo. G. V. C. Baker has been named vice president in charge of Hall-Toledo, and Milo C. Gray, formerly sales manager of the automotive department of Waterbury Tool, will be general manager. In announcing the acquisition, A. L. Baker, president of Baker Brothers, said the move was in accordance with the policy of F. W. Richmond, company chairman, to expand the operations of his plants by diversification of product.

★ ★ ★

FEDERAL MACHINE & TOOL ACQUIRES CARBIDE TOOL AND CUTTER FIRMS

Federal Machine & Tool Co., Inc., Long Island City, N. Y., has acquired Atlantic Carbide Company and Colonial Tool & Cutter Company, both of Rochelle Park, New Jersey, according to Arthur Ellins, president of Federal. The latter two companies will henceforth be operated as a single firm known as Federal Carbide & Cutter Company, Incorporated, and will be affiliated with Federal Machine & Tool



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Calibration by interferometry	±.0000002"
Accuracy of Calibration	±.0000008"
Coefficient of expansion, per 1° F. per inch	4 x 10 ⁻⁶
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Corrosion resistance—approx. 10 times that of 18-8 Stainless Steel	
Material—Chrome Carbide	

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Cleveland 11, Ohio

Largest Exclusive Manufacturers of Precision Gage Blocks

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news of the industry . . .

and its subsidiary, Federal Services Company which specializes in tool designing. Mr. Ellins will be president of Federal Carbide & Cutter, and Don de Salvo, who owned Colonial Tool & Cutter, will be vice president and treasurer. A. B. Rosenberg has been named vice president and secretary.

Concentrating on carbide and high

speed steels, the company will render a complete cutter grinding service and will convert standard tools into special tools, as well as manufacture single point tools and form tools.

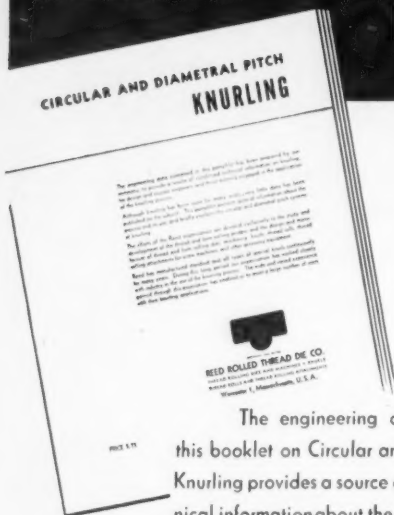
★ ★ ★

N. A. WOODWORTH OPENS COMPANY IN ONTARIO

Precision gages and chucking tools are now available to Canadian industry through the establishment of N. A. Woodworth, Canada, Limited. Officers of N. A. Woodworth, Canada, Limited, are J. A. Stebbins, president; W. A. Alexander, vice president and treasurer; J. A. Spencer, secretary; and Lee E. Moros, assistant secretary and treasurer. The home office of the new firm is located at 211 Greenwich Street in Brantford, Ontario.

Recognized for many years in the United States as chucking and gaging specialists, Woodworth technicians are working with H. H. Whitehall, Ltd., Galt, Ontario, to produce these products. H. H. Whitehall will produce all the well-established products, such as

Looking for Technical Information on Circular and Diametral Pitch Knurling?



The engineering data contained in this booklet on Circular and Diametral Pitch Knurling provides a source of condensed technical information about the process and its use.

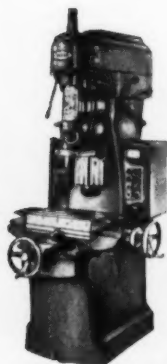
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THREAD ROLLING MACHINES AND DIES, THREAD ROLLING ATTACHMENTS, THREAD ROLLS AND KNURLS FOR AUTOMATIC SCREW MACHINES AND TURRET LATHES
WORCESTER, MASSACHUSETTS, U. S. A.

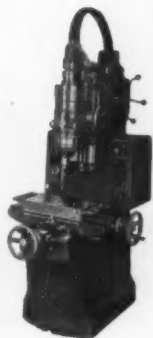
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NOW IS THE TIME TO PLAN AHEAD

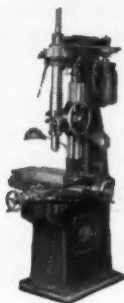


No. 2 MOORE JIG BORER, with its accurate lead screw settings within .0001", offers all the time-proven precision features associated with Moore Jig Borer construction for 15 years, plus numerous labor-saving advantages, including: increased capacity and size; infinitely variable spindle speeds; 3 power feed ratios; centralized controls.

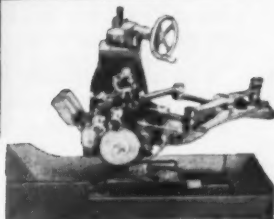
No. 2 MOORE JIG GRINDER. With this new and larger Moore Jig Grinder, regular and irregular contours are ground to size and location after hardening. This extends the Jig Grinder's traditional function of re-locating straight and tapered holes. Holes from $\frac{1}{8}$ " to 8" can be relocated and ground within .0001"—by power or hand feed.



Four ways to
cut costs and
meet competition
by mechanizing
your toolroom.



No. 1 MOORE JIG BORER remains in the line. For its range—table working surface of 10" by 16" and cuts up to $3\frac{1}{2}$ "—this machine is still an ideal buy. There are over 1300 satisfied users. We will continue to offer it for the many situations where a small, accurate jig borer fills the required prescription.



MOORE PANTO-CRUSH WHEEL DRESSER speeds form-grinding and cuts costs. Both crush-forming and diamond-dressing are accomplished with this 2-in-1 unit permanently mounted on the wheel spindle of a surface grinder. You switch from one method to the other without disturbing workpiece setting.

We'll be glad to send you complete descriptive literature on any of these machines.

MOORE SPECIAL TOOL COMPANY, INC.
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ADD TO YOUR TOOLROOM

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by using Whitehead Stock Washer Dies.

1500 SPECIAL SIZE DIES ON HAND.

Whitehead makes washers and shims from any metal or special material to your specifications. Thickness from .002" to $\frac{3}{8}$ ".

In stock: S.A.E. standard light, medium, and heavy steel washers; brass and copper, small and large patterns; bolt sizes. Write for Whitehead's Catalog.

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news of the Industry . . .

"Cone-Lok" jigs, both cylindrical and thread gages and diaphragm chucks and arbors. Named as exclusive sales agents for Woodworth products is Alexander and Orlick, Limited, with offices in Brantford, Hamilton, Montreal and Windsor.

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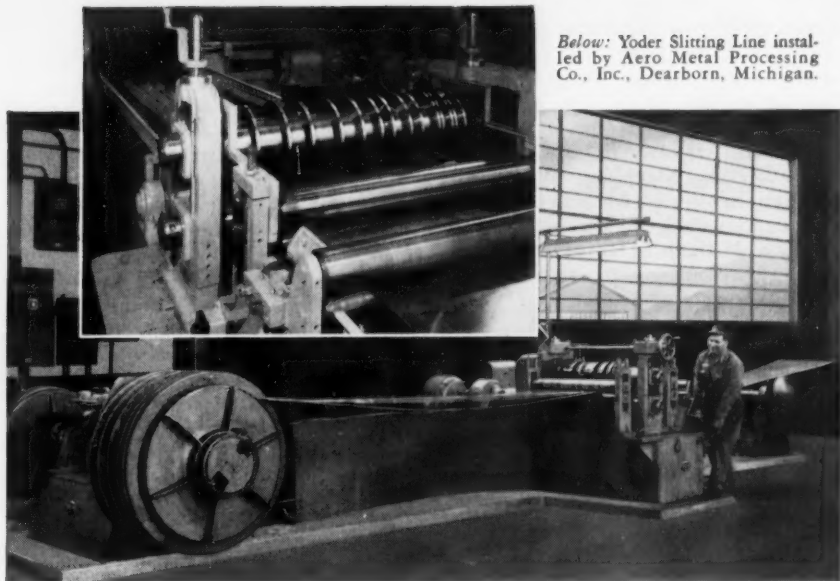
NATIONAL TWIST DRILL PURCHASES STAPLES TOOL COMPANY

Howard L. McGregor, Jr., president of National Twist Drill and Tool Co., Rochester, Mich., has announced the purchase of the assets of Staples Tool Co., Cincinnati, Ohio. Staples is an old, established manufacturer of high quality carbide-tipped reamers, counterbores and end mills. The new owners will round out the line by adding carbide-tipped twist drills, milling cutters and other similar tools. No significant changes in the Staples management or location are contemplated. There will be plant improvements and additions of equipment and processes at the Cincinnati plant. Staples will continue to produce and sell under its own name.

★ ★ ★

U. S. INDUSTRIES ACQUIRES FRAY MACHINE TOOL COMPANY

U. S. Industries, Incorporated, has announced the acquisition of the assets of Fray Machine Tool Co., Burbank, Calif. Fray, which has been in business since 1931, manufactures milling machines, milling machine heads and offset boring heads for toolroom and production use. The Fray operation will be moved into the Vernon (Los Angeles) plant of U. S. Industries' Axelson Manufacturing Company di-



Below: Yoder Slitting Line installed by Aero Metal Processing Co., Inc., Dearborn, Michigan.

When is a Slitting Line Profitable?

Many variables are to be considered in determining where and when a slitting line becomes a good investment. Also of what size, type, speed it should be, and other special features required to make it most profitable under any given set of conditions. Without obligation, a Yoder representative will call upon request and discuss such details with you.

The Yoder Slitter Book deals extensively with basic considerations in the choice and operation of slitting lines; points out, for instance, how and where a relatively small, inexpensive installation

may be more economical than a larger, faster, and costlier one. (Yoder makes all types). Time studies show how coil size, strip gauge, slitter speed, coil handling and banding time affect cycle time and cost per ton.

The book is useful not only to present operators of slitting lines but to producers, users and distributors of strip and sheet metal who may be considering installing slitting equipment. A copy is yours for the asking.

THE YODER COMPANY

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Complete Production Lines

- ★ COLD-ROLL-FORMING and auxiliary machinery
- ★ GANG SLITTING LINES for Coils and Sheets
- ★ PIPE and TUBE MILLS—cold forming and welding



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news of the industry . . .

vision, which already manufactures a line of engine lathes. No additional equipment will be required to manufacture the Fray line of machines. The Fray Milling Machine will be sold through the present Axelson lathe sales organization and will be known as the Axelson Milling Machine. According to company officials, the acquisition of

the assets of Fray is in line with U. S. Industries' program of product diversification.

★ ★ ★

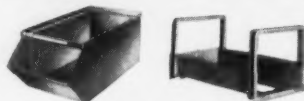
N. DOUGLAS MacLEOD, JR., ELECTED EXECUTIVE VICE PRESIDENT OF ABRASIVE MACHINE

Abrasive Machine Tool Co., East Providence, R. I., has announced the election of N. Douglas MacLeod, Jr., as executive vice president. The election took place at the year-end meeting of the board of directors. Mr. MacLeod's new duties encompass supervision of all company operations. A son of the company president, Norman D. MacLeod, he joined Abrasive Machine in 1946 as an apprentice machinist. During his four-year apprenticeship, he also attended night school, studying

STOP

excess handling of tools, parts, materials!

Stackbin®-Stackrack® Combinations are the ideal way to minimize parts, tools, materials handling. Stackbins are portable containers, so you can carry materials throughout your process without transferring contents to any other container. Stored in Stackracks, every Stackbin is instantly accessible when it's needed. You never disturb another bin. Hopper fronts on Stackbins provide visibility and accessibility to the materials. Available in 7 sizes, Stackbin-Stackrack Combinations make most efficient use of floor space. With inexpensive Adapters any small units can be stacked on larger units. Related items can be kept in one place. Individual units lock together: no tools, no setup time needed.



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COMBINATIONS

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N. D. MacLeod, Jr.

How to Cut the Cost of Gaging Threads

with TAFT-PEIRCE JOB-RATED GAGES

The best gage for most jobs provides the best combination of speed, wear-resistance, upkeep, and initial cost. Here are some comparisons that will help you keep costs to a minimum.

Thread Plugs



T-P Limit Thread Plug Gage. Standard hardened steel gages are lowest in initial cost and are preferable when soft or moderately hard materials are being inspected in limited quantities. Taper-Lock up to 1.510". Reversible from 20 to 1/2". Reversible Tri-Lock above 1.510".



T-P Electroplated Gages. With only a modest increase in initial cost, substantially longer wear life can be obtained with this exclusive surface treatment. Many users report up to 3 times longer gage life.



T-P Carbide Thread Plug Gage. For exceptional resistance to abrasion or scratching and maximum wear life. Furnished in both standard and special sizes — from 28 machine screw size up.

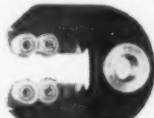
Rings & Snaps



T-P Thread Ring Gages. Lower in initial cost than other gages for external threads, they check a combination of all thread errors but cannot distinguish between them.



T-P Adjustable Thread Snaps. Faster than ring gaging, and just as accurate, they check lead, angle, and all other thread elements. Pitch diameter is variable.

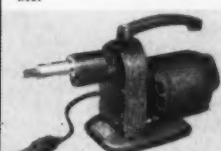


T-P Roll Thread Snaps. Same as adjustable, with rolls for gaging members. Since gaging members rotate, wear is spread over greater surface and service life increased.

Special Gages



T-P Rotocheck (Flexible Shaft Model). Fastest thread gaging method yet devised. Push—and the gage screws into the work. Release the pressure and it stops. Pull—and it disengages. Can be used with most standard T-P plug or ring gages.

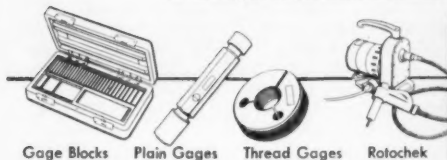


T-P Rotocheck (Bench Model). Permits bringing work to gage, instead of gage to work. Like flexible shaft model, records indicate it triples rate of parts inspection.



T-P Thread Concentricity Gage. Typical of the infinite variety of special gages made to order by T-P every year. This one checks size and location of internal threads.

For the complete story on these items and many more, send for your copy of the Taft-Peirce Handbook.



Gage Blocks

Plain Gages

Thread Gages

Rotocheck

*T-P means
Top Precision*



THE TAFT-PEIRCE MANUFACTURING COMPANY, WOONSOCKET, R. I.

For more data circle 437 on Reader Service Card

news of the industry . . .

business, engineering and accounting. Following his graduation as a machinist, Mr. MacLeod joined the inspection department at Abrasive. He was later made personnel manager. In 1951, he was promoted to production manager, serving in that capacity until last March when he was elevated to the

position of assistant general manager.

Mr. MacLeod is a member of the Providence Engineering Society, a director of the Providence Junior Chamber of Commerce and past chairman of the Industrial Exposition at Union Station.

★ ★ ★

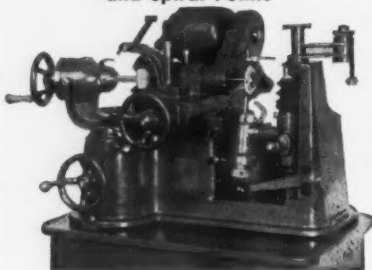
CARBORUNDUM ACQUIRES CURTIS MACHINE CORPORATION

The Carborundum Co., Niagara Falls, N. Y., has acquired the Curtis Machine Corporation, according to a joint announcement by General Clinton F. Robinson, president of Carborundum, and Gene DeMambro, president of Lincoln Park Industries, Incorporated, of which Curtis Machine was a wholly-owned subsidiary. Mr. DeMambro, president and general manager of Curtis Machine since 1946, will continue in that capacity, reporting to William H. Wendel, vice president in charge of Carborundum's Coated Abrasives Division in Wheatfield, New York. Mr. Wendel will coordinate the activities of Curtis Machine in The Carborundum Company.

Curtis Machine, operating in Jamestown, New York, since 1913, pioneered in the manufacture of belt sanders and rubbing machinery for the furniture industry. For the past 10 years under Mr. DeMambro's presidency, the company has developed many new ma-

HYBCO TAP GRINDER

Sharpens Chamfers, Flutes
and Spiral Points



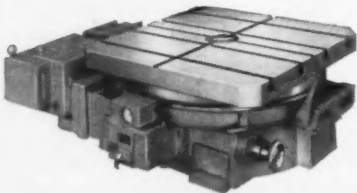
MODEL 1100

- Capacities No. 0 Machine Screw to 1 1/2" Hand Taps.

HENRY P. BOGGIS & CO.

708 E. 163rd St., Cleveland 10, Ohio
Cleveland 10, Ohio

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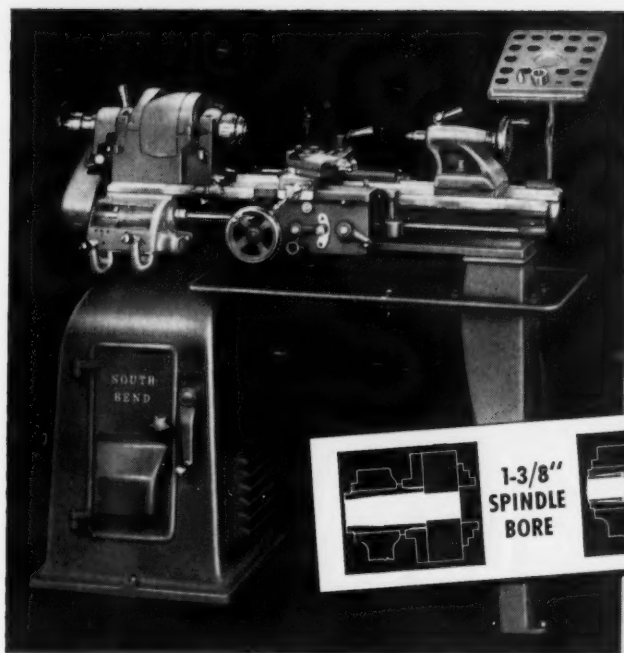


FASTER set-ups and positioning

You save set-up and positioning time with Gilbert rotary tables. *Hand-indexing:* 36" and 50" square or round. *Power rotary and power feed:* 36", 50", 60", and 72" square or round. Special tables built to your requirements. For complete descriptions and specifications, write for Bulletin 854.

THE CINCINNATI **GILBERT** MACHINE TOOL COMPANY • CINCINNATI 23, OHIO

For more data circle 439 on Reader Service Card



SOUTH BEND 10" Lathes



10" Precision TOOLROOM LATHE

Sound design, expert workmanship and quality materials give the 10" South Bend Lathe the dependable performance you want. Equipped with a precision lead screw, thread dial indicator and thread cutting stop, you can use it with confidence for cutting screw threads, making precision gauges or turning out instrument parts.

Another outstanding feature is the 1" collet capacity and 1-3/8" spindle bore which is built on the same design and specifications of larger lathes. The large spindle bore gives you big lathe collet capacity in a small, compact unit.

10" Toolroom Lathe, illustrated, less motor and controls. Time payment terms available.

\$1526.00
f.o.b. Factory

SPECIFICATIONS

SWING 10 1/8" over bed and saddle wings, 5 3/4" over cross slide.

COLLET CAPACITY 1 in.

SPINDLE BORE 1 3/8 in.

BED LENGTHS 3, 3 1/2, 4 feet.

CENTER DISTANCES 14 1/4 to 26 1/2 inches.

SPINDLE SPEEDS (12) 50 to 1357 r.p.m., approximately.

POWER LONGITUDINAL FEEDS

70 R.H. or L.H. .0007" to .0836"

POWER CROSS-FEEDS 70

.0003" to .0303"

THREAD CUTTING 70 R.H. or

L.H. pitches, 4 to 480 per inch.

Compared with our costs
OUR PRICES ARE LOWER
than they were back in 1941



Prices are closely tied to costs. Costs are still rising. Buy now before increased costs necessitate higher prices.

SEND INFORMATION CHECKED:

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|  |  |  |  |  |  |
| <input type="checkbox"/> 9" and 10" BENCH LATHES | <input type="checkbox"/> 10" to 16-24" FLOOR LATHES | <input type="checkbox"/> DRILL PRESSES | <input type="checkbox"/> TOOL GRINDERS | <input type="checkbox"/> 1/2" & 1" Collet TURRET LATHES | <input type="checkbox"/> 7" BENCH SHAPERS |

Name _____ Street _____

City _____ State _____

Building Better Tools Since 1906 • **SOUTH BEND LATHE** • South Bend 22, Indiana

For more data circle 440 on Reader Service Card

news of the industry . . .

chines introducing the principle of abrasive belt grinding in the metal-working industry. According to company officials, the purchase of Curtis Machine by Carborundum makes possible close integration of Curtis Machine's engineering skill in abrasive belt machine building and Carborundum's abrasive belt engineering know-

how. The move is intended to provide new abrasive belt machines and improved abrasive belts for industry.

★ ★ ★

**BLAKE-WAINDLE
CORPORATION FORMED**

Edward Blake and Roger F. Waindle, both of Newton, Massachusetts, have announced the formation of the Blake-Waindle Corporation which is

designed to assume ownership of the present Edward Blake Co., 437 Cherry St., West Newton, Mass., and the WaiMet Engineering Company, formerly of Muskegon, Michigan. Both companies will continue to operate under their separate names which are established and well known in the fields they serve.

The Edward Blake Company is the manufacturer of commercial machines for precision grinding of the flutes and chamfers of taps, widely used by both tap manufacturers and industrial users of taps. The company also acts as sales agent for the distribution of other products, including Black Diamond Preci-



ELGIN
GOLDEN-CIRCLE
ROTARY TOOLS

backed by ELGIN'S reputation
for quality leadership

Here is a new performance-tested line . . . burs and rotary files, carbide or high-speed steel, shapes and sizes to meet every need. They're precision-made and proudly marked with the Golden Circle, symbol of dependable ELGIN quality. Write for your copy of the "Golden Circle" booklet today!

FREE BOOKLET

... see how many operations can be made easier and faster. See how many shapes and sizes are made to meet your need.

ABRASIVES DIVISION, DEPT. P

ELGIN NATIONAL WATCH COMPANY
ELGIN, ILLINOIS

For more data circle 441 on Reader Service Card

**Prove it to your-
self right in your
own plant...**



MID-WEST WHEELS CUT SURFACE GRINDING COSTS!

S11A Mid-West cool cutting wheels have been tested in the tool rooms of our customers all over the country. Results: operating costs were cut, while grinding efficiency was increased!

The reasons are simple. First, because of the quality of materials used. Made with a sharper, harder Aluminum Oxide grain in a glassy vitrified bond, Mid-West wheels offer top grinding results; yet you save on costs. Second, because each Mid-West cool cutting wheel is made for a specific tool room application. Using the right wheel for the right job not only increases grinding efficiency, but speeds up your production time. Your results are bound to be better! See for yourself . . . right in your own plant!

For complete information regarding Mid-West cool cutting grinding wheels, write, wire or phone today.

MID-WEST ABRASIVE CO.

Executive Offices: 510 So. Washington St., Owosso, Mich.

Factories: Owosso, Mich., Rochester, Pa.



For more data circle 442 on Reader Service Card

news of the industry . . .

sion Drill Grinders and University Surface Finish Standards. Mr. Blake, owner of the company, will become president and treasurer of the new firm.

Mr. Waindle, who will be vice president and secretary of the new concern,

was recently national president of the American Society of Tool Engineers. He will continue to operate WaiMet Engineering Company, metallurgical process and products consultants, which is also exclusive distributor of certified Master Stainless Alloys produced by the Michigan Steel Casting Company. Prior to establishing WaiMet, Mr. Waindle was co-founder of Cannon Muskegon Corporation of Michigan and general manager of the Industrial Division of Elgin National Watch Company.

★ ★ ★

MERGER OF HYDRAULIC PRESS MANUFACTURING COMPANY AND LODGE & SHIPLEY

Recent discussions between The Hydraulic Press Mfg. Co., Mount Gilead, Ohio, and The Lodge & Shipley Co., Cincinnati, Ohio, led to the submission of an informal proposal by William L. Dolle, president of Lodge & Shipley. Mr. Dolle acted on the authority of his board of directors in submitting the proposal to the board of the 77-year-old Mount Gilead firm. The proposal was accepted, and Mr. Dolle, speaking on behalf of Lodge & Shipley and for John C. Cotner, president of Hydraulic Press Manufacturing, announced that a basis of merger had been reached. Details of the merger will be submitted to the directors and stockholders of both companies.



GEARS

In Stock—Immediate Delivery

Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on special gears of any kind. Send in your blueprints and inquiries.

Send for Complete Catalog No. 20

CHICAGO GEAR WORKS

440-50 N. Oakley Blvd., Chicago 12, Ill.

For more data circle 443 on Reader Service Card

REID

TOOL ROOM ACCESSORIES

MALLEABLE MACHINE HANDLES



CRANK

STRAIGHT

OFFSET

Finest and most complete available. Made in 3 styles and in a large variety of sizes. Well proportioned. Neat in appearance. Smooth finish. Stands up under severe usage. Low prices. ALSO plastic and steel ball handles. C.I. hand knobs, compression springs, etc. Finest quality. Low prices.

FREE

NEW 56-Pg.

CAT.

REID TOOL SUPPLY CO.

Muskegon Heights, Michigan

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Quick Shipment on

TAPER ATTACHMENTS



For All Lathes—Old or New—9" to 36" Swing
Write for Bulletin

MASTER-TAPER COMPANY

4531 N. Beacon St., Chicago 40
Excl. Mfrs. of Taper Attachments

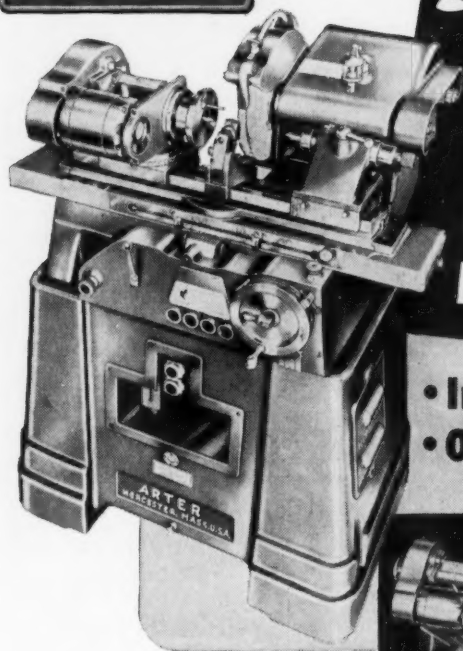
\$29.50

to

\$149.50

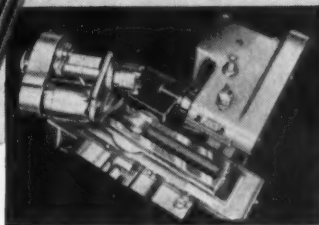
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ARTER



Dual Purpose
cylindrical and
internal grinder
for
**ECONOMICAL
PRODUCTION**

- In the tool room
- On production work



Internal grinding head with
the work head swivelled.

Model EG-103

Arter Model 103 is one of a line of precision grinders of many types which we have been building for over thirty years. This relatively low-priced grinder is a dual purpose machine that can be arranged as a Plain Cylindrical Grinder or, by changing wheelheads, as an Internal Grinder. It is designed for use wherever a small-in-capacity machine is needed as prime equipment or as an auxiliary to larger machines.

ARTER GRINDING MACHINE COMPANY
WORCESTER • MASSACHUSETTS

Agents in industrial centers of United States and Canada

For more data circle 446 on Reader Service Card

news of the industry . . .

The Hydraulic Press Manufacturing Company, manufacturer of hydraulic metalworking presses, plastic molding machines, die casting machines and hydraulic pumps and supplementary equipment, will merge with Lodge & Shipley under the terms of the agreement. Lodge & Shipley is a well-known

manufacturer of lathes and also has a Hamilton, Ohio, subsidiary, The Columbia Division, which makes shears, press brakes and hydraulic presses.

★ ★ ★

WILLIAM E. CROSS

William Edward Cross, hardware executive and civic leader, died recently at his home in Middletown, New

York, after a long illness. Mr. Cross, who was 68 years of age, was president of three industrial hardware concerns in Middletown; namely, Clemson Brothers, Incorporated, Victor Saw Works, Incorporated, and Napier Saw Works, Incorporated. Mr. Cross joined Clemson Brothers in 1918, and during his business career was appointed first sales manager and then treasurer. He became president of the three hard-



HOW MANY

HOLDING JOBS

DO YOU HAVE?

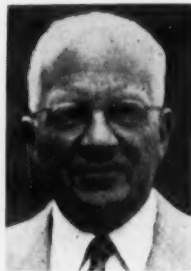


How many holding jobs do you have for the new Jacobs Model 96 Rubber-Flex Collet Chuck? Frankly, we don't know all the applications possible for this marvelous holding device. We do know it is the most accurate collet chuck in the world . . . that it has a gripping power unmatched by any split steel collets . . . and that it holds any piece from $\frac{1}{16}$ " to $1\frac{1}{8}$ " in diameter — with only 11 collets.

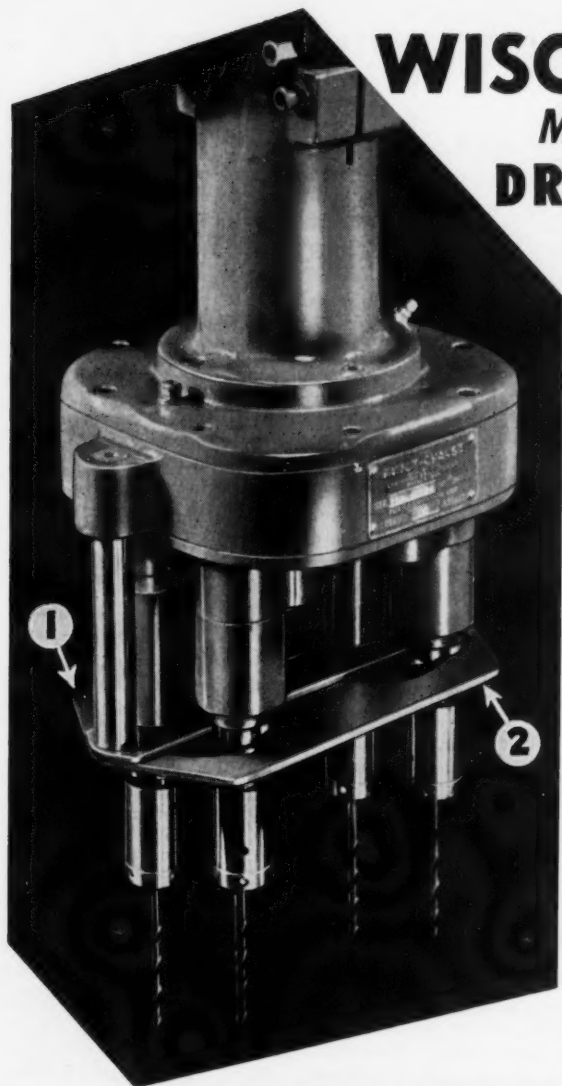
We would like to hear about your work or tool holding ideas for the Model 96. For all the pertinent facts about this new chuck see your industrial distributor, or write directly to The Jacobs Manufacturing Co., 2103 Jacobs Road, West Hartford 10, Connecticut. Ask for Bulletin 54-CC.

For more data circle 447 on Reader Service Card

Jacobs
CHUCKS
If it's a Jacobs it holds



William E. Cross



WISCONSIN

Multiple DRILL HEADS

Adjustable and Fixed-Spindle Types

Adjustable Spindle Heads have Dual Positioning Plates for fast, accurate set-ups that "stay put".

Positioning and Locking Templates are furnished for each bolt circle or hole pattern . . . to your exact specifications.

Half-hole Positioning Plates (1) make it easy to swing spindles into place quickly. Locking Plates (2), with full holes, are mounted on support posts to lock set-ups securely against shifting.

6 Capacity Ranges . . . from "Light Duty" to "Extra Heavy Duty". Standard Models have 2 to 8 spindles. Special Models built to order.

1. Half-hole Positioning Plate.

2. Locking Plate has full holes to hold spindles in place.

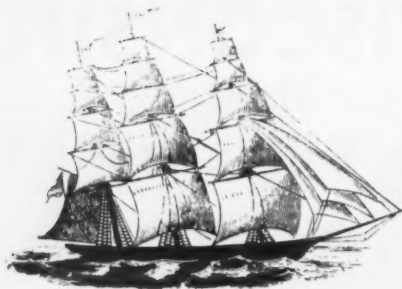
Send print of Hole Pattern for estimate.

WISCONSIN DRILL HEAD CO.

4983 N. 124TH STREET

BUTLER, WISCONSIN

For more data circle 448 on Reader Service Card



The Past...



The Future—

The slow steps of the past are gone . . . for the present, the future, get better production and finer finishes with Whitton Precision Spindles.

Equip your new Surface Grinders with Whitton Spindles . . . for easy adaptability and for modernizing your old machines.

These rugged Spindles are for today, tomorrow . . . and for high production. They're made to last long . . . powerful springs prevent chatter regardless of wear or temperature changes, and the sealed-in lubrication requires no attention. Whitton Spindles assure micro-finishes . . . the Spindle assembly is precision balanced on its own bearings, which are the most accurate obtainable.

The present, the Future, and Whitton Spindles . . . all teamed for you.



For more data circle 449 on Reader Service Card

news of the industry . . .

ware companies in 1946. He was also a former president of the Hack Saw Blade Manufacturers Association. Mr. Cross took an active part during the expansion of Clemson Brothers into lawn mower manufacture.

★ ★ ★

HARIG MANUFACTURING ANNOUNCES EXECUTIVE CHANGES

At the annual board of directors meeting, stockholders of Harig Manufacturing Corporation elected Karl Harig, former president, to the position of chairman of the board. Other changes in executive titles are as follows: Herbert Harig, president and treasurer; Theodore Eckert, vice president of manufacturing and secretary; and William Thorpe, vice president of sales. The Harig plant is located at 5757 W. Howard Street in Chicago and manufactures precision dies and machine tool products.

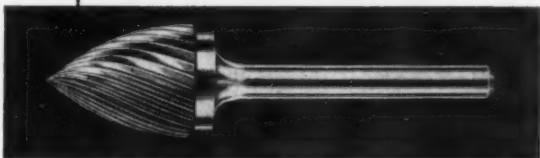
★ ★ ★

SAMUEL STERN

Samuel Stern, founder and president of the Action Diamond Tool Co., Chicago, Ill., died recently at the age of 55 years. Mr. Stern devoted 25 years of his life to the manufacture of diamond abrasive wheels and tools of which he held several patents. He was one of the originators of the diamond impregnated wheel for the grinding of carbides. Migrating from Hungary approximately 34 years ago, Mr. Stern began his career as a diamond setter. Nine years later, he began manufacturing diamond dental wheels and then branched out into the manufacture of industrial diamond wheels for the defense efforts.

ATRAX

IN ACTION



**\$3,000 SAVINGS IN
LABOR WITH \$100
WORTH OF CARBIDE BURS**

A CASE HISTORY: One of our customers had an extremely difficult problem of burring some piece parts after assembly. After consultation with Atrax engineers, it was determined that Solid Carbide Burs were the only type that could be used to salvage this huge job. Six Carbide Burs were bought for this job, totalling approximately \$100.00. They saved the company over \$3,000.00 in labor. Besides this, they made possible salvage of very valuable piece parts for a very nominal original investment.

Possibly our engineers or sales representatives can help YOU achieve similar savings. You'll find them in all principal cities, ready to consult without any obligation.



**NEW! Complete 88-page Manual and Catalog
of Carbide Tools. Write for your free copy.**

THE ATRAX

COMPANY

NEWINGTON 11,
CONNECTICUT

For more data circle 450 on Reader Service Card



Now—Lock Your Feed Rates to Protect Machines . . . Reduce Costs with the **CROSS** Flow Control Lock!

Only authorized personnel carry a key for the Cross Flow Control Lock! They set machine feed rate, then lock it.

Easy to install. Just remove valve nameplate and adjusting lever, re-install over lock mounting plate.

Available for Vickers 1/4" flow control valves and remote control panels.

For full details, write Dept. A-62.

- Eliminates Tampering
- Stops Costly Shutdowns
- Prevents Tool Abuse and Breakage
- Protects Machines Against Overloads
- Reduces Maintenance Costs

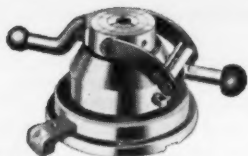
Established 1898

THE **CROSS** CO.
DETROIT 7, MICHIGAN

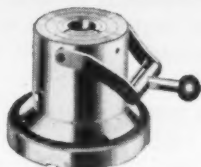
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Zagar Tools

HOLD YOUR WORK—AND YOUR BUSINESS!



Collet indexing fixture



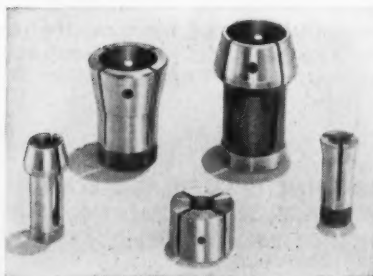
Collet holding fixture



Vertical-horizontal
collet fixture

ZAGAR HOLDING and INDEXING FIXTURES

Zagar fixtures offer you a most inexpensive way to machine small parts. Set-up is speeded and much special tooling eliminated. Slot milling, straddle milling, drilling, tapping and grinding of small pieces can be done most profitably with Zagar fixtures, available from stock.



COLLETS, PADS, BLANKS

Five types: No. 310 Zagar Master; Nos. 2 and 6 W. & S.; No. 5-C; No. 6 W. & S. pads. All but Zagar No. 310 are standard machine tool sizes. All collets are made of oil-hardened tool steel; have flat tops for locating purposes.

Write for Engineering Sheets "S-3"
on each product.

ZAGAR TOOL, INC.

24000 LAKELAND BLVD.
CLEVELAND 23, OHIO



For more data circle 452 on Reader Service Card

new shop equipment

*Descriptions of new machines, tools
and materials for the metalworking
industry*

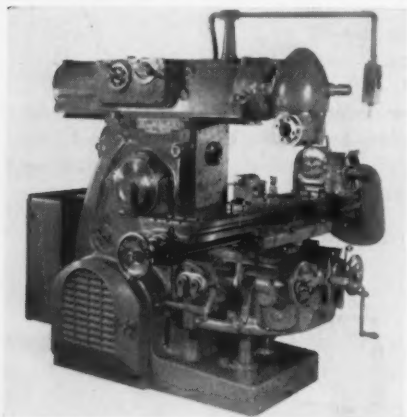
MILLING MACHINE COMBINES HORIZONTAL SPINDLE AND MOTORIZED SLIDING RAM

A ram head milling machine which combines a conventional horizontal spindle and a self-contained motorized sliding ram for adjustable cutting heads, thus allowing horizontal and vertical spindles to be run separately and simultaneously, has been announced by Kearney & Trecker Corp., Milwaukee 14, Wis. The ram head machine is available with a choice of three cutting heads; namely, universal, vertical and quill types which can be ro-

tated through 360 degrees so that the user can perform vertical, horizontal and angular milling on one machine in a single setup. The machine can be supplied in Model CH, CK and CSM designs, with 69 different working range combinations, and in sizes from No. 2 to No. 4 in both plain and universal styles. The machine may be equipped with either standard directional table control or mono-lever with automatic cycle table control.

For maximum versatility with minimum maintenance, the ram head is individually motor driven and has its own lubrication system and speed-change mechanism. When used as a standard horizontal machine, the ram acts as a heavy-duty arbor support.

For more data circle 13 on Reader Service Card



Kearney & Trecker Ram Head Milling Machine

★ ★ ★

MACHINE IS DESIGNED FOR PRODUCTION THREADING OF PIPE AND NIPPLES

Designated as the No. 6B, a double spindle machine which is designed for the production threading of pipe and nipples from $\frac{1}{8}$ to $\frac{3}{4}$ inch in diameter has been introduced by Landis Machine Co., Waynesboro, Pa. The tangential chaser threading heads furnished with the machine are equipped with reamer attachments to enable the

threading, reaming and chamfering operations to be performed simultaneously. These die heads also feature an internal trip mechanism to provide constant thread length regardless of normal differences in the nipple length or in the gripping position. The machine is designed with five spindle speeds ranging from 133 to 310 r.p.m. With these speeds, each of the five pipe diameters within the range of the machine can be threaded at the most efficient speeds. Additional speeds can be supplied for special applications.

The machine bed is of a smooth, sturdy construction and is equipped with a replacable hardened and ground ways for guiding and supporting the carriage. Other bed features include a large screened opening over the coolant reservoir for rapid coolant return; ample chip space; large doors for chip removal from either side of the machine; and a wide drip ledge around the bed to return any coolant overflow. The carriages are operated by levers and provide a 6-inch travel. A hammer-blow handwheel is used to operate the carriage vise which is adjustable both horizontally and verti-

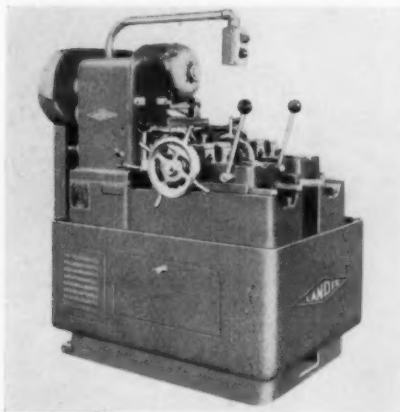
cally to assure proper work alignment with the die head. The motor is mounted on top of the headstock in a position where it is easily accessible for lubrication and inspection. Starting and stopping is controlled by a push-button station mounted on a pivoted arm that can be moved to either side of the machine at the convenience of the operator.

For more data circle 14 on Reader Service Card

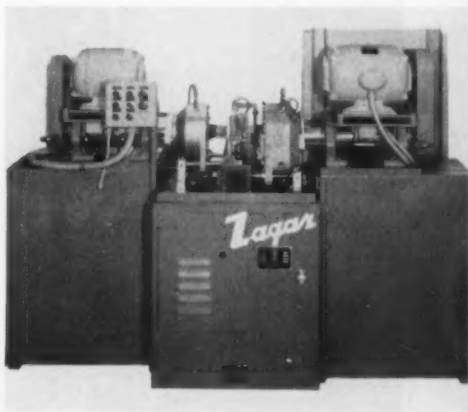
★ ★ ★

PRODUCTION MACHINE DRILLS AND COUNTERSINKS 100 HOLES PER HOUR

A special horizontal drill machine which produces $\frac{3}{8}$ -inch square steel inserts (sprags) for an automatic transmission assembly has been announced by Zagar Tool, Inc., 24000 Lakeland Blvd., Cleveland 23, Ohio. According to the manufacturer, the machine can be ideally used on a wide variety of setups. Interlocked electrically for automatic operation, the machine has two hydraulic feeder units and two Zagar gearless drill heads. Twenty holes are



Landmaco No. 6B Threading Machine



Zagar Special Horizontal Drilling Machine

new shop equipment . . .

drilled from one side in a rectangular rod of extruded bar stock at the first station, and the work is indexed manually to countersink the 20 holes from both sides at the second station. The bar is indexed progressively until a 10-foot piece is completely drilled. It is then put through an automatic punch press that cuts the bar into the sprags.

It is claimed that the machine has a potential production of 3,600 holes per hour.

For more data circle 15 on Reader Service Card

★ ★ ★

SPECIAL MACHINE TOOL PROCESSES CONNECTING RODS

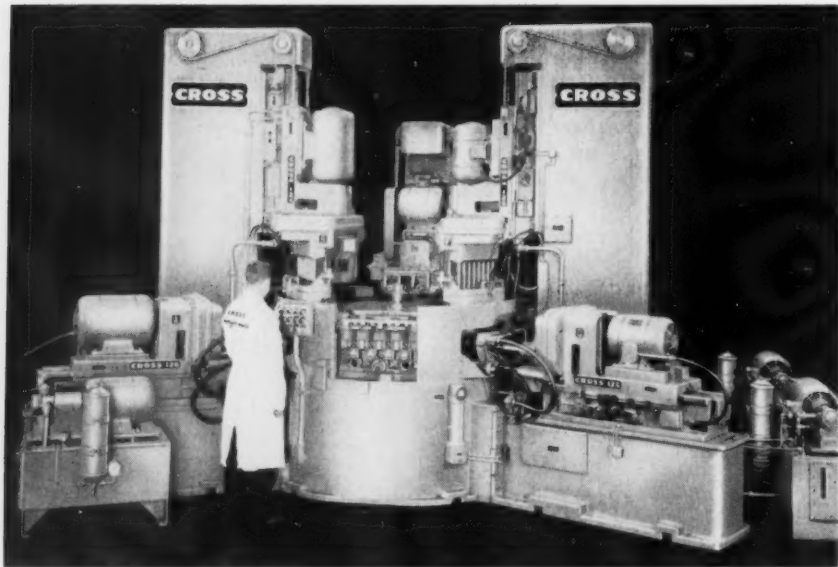
A special machine tool for processing connecting rods has been developed

by The Cross Co., Detroit 7, Mich. The machine is a dial type with six stations—one for loading, two for drilling, one for chamfering, one for milling and one for reaming.

The special machine, it is claimed, completes 52 operations per part, or a total of 23,400 operations on 450 connecting rods per hour at 100 per cent efficiency. It drills, reams and chamfers the bolt holes; drills, reams and chamfers the piston pin hole; and mills the lock slot.

The index table of the machine is fluid motor driven. Workholding fixtures are hydraulically power fed, and electrical and hydraulic construction conforms to Joint Industry Conference standards.

All standard and special parts are completely interchangeable for easy maintenance and to provide flexibility for part design changes. Other features of the machine include hardened and



Cross Special Machine Tool designed for use in processing connecting rods

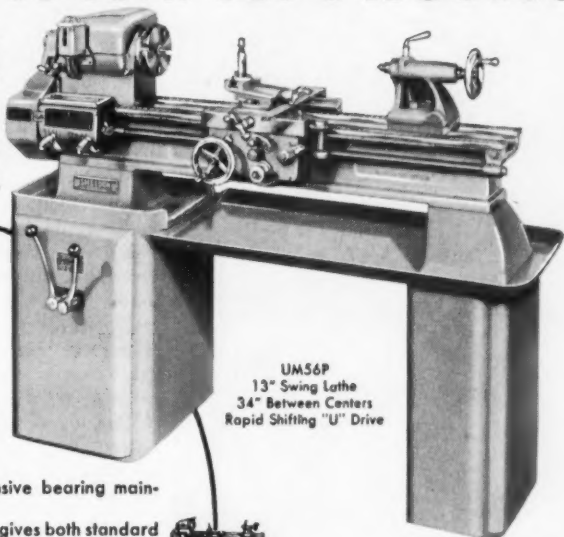
SHELDON

CHICAGO U. S. A.

BUILT

• • • to Turn out **PROFITS**

Sheldon Lathes are designed and built to do accurate lathe work rapidly and profitably. Moderate in price they have the collet, swing and power capacity to do most toolroom work.



UM56P
13" Swing Lathe
34" Between Centers
Rapid Shifting "U" Drive

Design

Features:

- Large and wide "Zero Precision" Tapered Roller Spindle Bearings—permit operation at all speeds, retain accuracy, end expensive bearing maintenance costs.
- 54-pitch Gear Box—gives both standard and many hard to get thread ratios.
- Large Micrometer Dials—Make accurate operation easier.
- Extra Collet Capacity—1½" hole through spindles available on 10", 11" and 13" swing lathes.
- More Power to Spindle—Efficient drives with bigger motors and double neoprene cog V-belts to spindle.

OPTIONAL FEATURES AT EXTRA COST

include: Hardened ways, Long Tapered Key Drive Spindles, 4" D1 Camlock Spindles bed turrets, collet attachments, and other production and toolroom accessories. Lathes available with a choice of "Bench," "Cabinet" or "Pedestal" mountings.

Write for New Catalog G-55

SHELDON MACHINE CO., Inc.

4250 N. Knox Ave.

Chicago 41, Illinois

SEE OUR DISPLAY AT THE WESTERN METAL SHOW, BOOTH 614

For more data circle 453 on Reader Service Card

QUALITY Depends on ACCURATE INSPECTION



Accuracy of measurement depends on the precision of the measuring tools. Provide your shop and inspection department with dependable and proper inspection tools. MEEHANITE METAL TOOLS, made to close tolerances, are furnished in many types.

Surface Plates — Box Parallels
Slotted Angle Plates
Universal Right Angles
Flat Parallels — Lapping Plates
Toolmaker's Knees — "V" Blocks
Straight Edges (Bridge Type)
Straight Edges (Leveling Type)
Measuring Irons
Masterangle Plates
Angle Attachments

Send for Bulletin

ACME TOOL CO.

73 W. Broadway, New York 7, N. Y.

For more data circle 454 on Reader Service Card

new shop equipment . . .

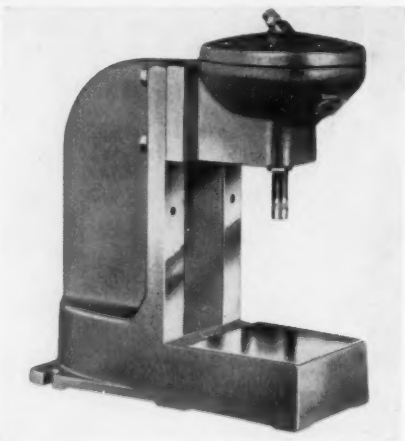
ground ways, automatic coolant system and hydraulic feed and rapid traverse. For more data circle 16 on Reader Service Card

★ ★ ★

AIR PRESS DEVELOPS POWER TO 15 TIMES AIR LINE PRESSURE

Identified as the Speedy Model 80, an air press which has a 1-ton capacity and which is said to be capable of developing power up to 15 times the air line pressure has been introduced by W. R. Brown Corp., 2649 N. Normandy Ave., Chicago 35, Ill. According to the manufacturer, the press incorporates gray iron castings with accurately ground surfaces and is adaptable to many uses, such as punching, stamping, stapling, crimping, assembling, clamping and bending. The heavy gray iron frame, it is claimed, assures column rigidity without breathing.

The air ram is adjustable to two positions, and the position of the threaded ram plunger can be rapidly adjusted up to 2½ inches. The diaphragm-



Brown Speedy Model 80 Air Press



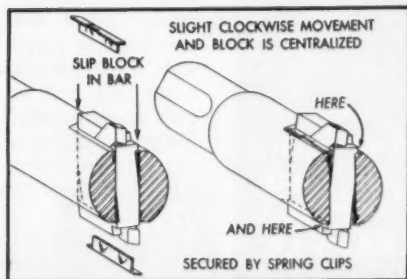
Quick-Change Boring Blocks for Roughing, Semi-Finishing, Reaming

These interchangeable blocks are quick inserting, self-centering, positive locking in the boring bar without locating holes or screws. Just slip the block into the slot of the bar and engage the projecting lugs to the ground flats on the bar. It is then perfectly centered. A pair of spring clips hold the block in place (see below).

The fully adjustable blades are pre-set to size. Standard blocks run $1\frac{1}{4}$ " to $7\frac{3}{4}$ " diameter, larger sizes are made to order. Blades are highspeed steel, cast alloy, or carbide tipped.

Bars, not weakened by locating holes, withstand the strain of heavy cutting. Ends of each slot are ground after hardening to take the cutting thrust of the blocks, provide rigid support.

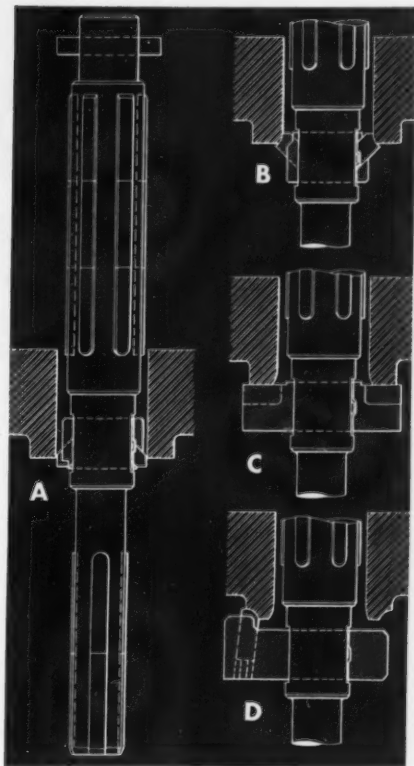
The features of Gairing Boring Blocks have made many unique applications possible.



For more data circle 455 on Reader Service Card

Unusual Production Job Made Possible by Quick-Change Feature

After forward stroke boring, using standard boring block (A), three other operations were performed alternately on the backward stroke of the spindle. Standard block with specially ground blades (B) and special blocks (C, D) use the same slot in the bar.



For full data on Standard Blocks and Bars, many more examples of production applications, see the Gairing Boring Tool Catalog. Write us, or call your local Gairing representative.

THE GAIRING TOOL COMPANY

Tooling—Standard and Special
21235 HOOVER ROAD, DETROIT 32, MICH.

new shop equipment . . .

actuated ram is said to be fast and powerful with rapid spring return. Lighter pressure may be obtained by utilizing an air pressure regulator. The press operates on air line pressures ranging from 5 to 150 pounds. Ram clearance is from 0 to 5 inches with a

$\frac{5}{8}$ -inch stroke. Throat clearance is to the center of a 10-inch diameter circle. For more data circle 17 on Reader Service Card

★ ★ ★

AUTOMATIC WET GRINDER FEATURES WIDE CAPACITY

Peterson Welding Labs, Inc., 1423 Virginia Ave., Kansas City 6, Mo., has announced an automatic wet grinder

which is designed for fast, efficient, accurate grinding and finishing of all types of metals and alloys and which accommodates the smallest parts up to and including workpieces 64 inches long by 16 inches wide by 24 inches high. The machine is said to provide easy loading, quick setup and alignment, full vision grinding and fully automatic operation. It utilizes a 5-inch faced, flat-dressed, 16-inch grinding wheel and a unique coolant flushing system. According to the manufacturer, the machine is capable of making a 0.010 inch cut in cast iron in a single pass, leaving a smooth surface finish of from 30 to 80 r.m.s.

The grinder permits even the largest



The coolant stinks, eh?

Well, don't dump it!

We'll kill that odor with the new powder-additive: **Rance-RID**

IT'S A SERIOUS COST-PROBLEM:

Metalworking plants are pouring coolant and labor dollars down the drain. The reason: coolant turns rancid.

RANCE-RID SOLVES THE PROBLEM:

It restores the original condition of the oil emulsion. It smells, looks, and is like new. No masking odors are used . . . Use it in central-type coolant systems, or in individual machines. Treat the same coolant over and over again!

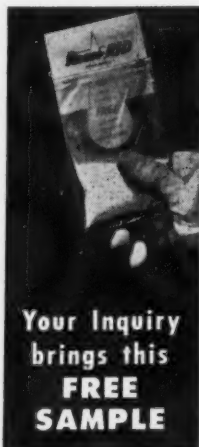
TRY RANCE-RID—AT OUR EXPENSE:

That sounds generous. Actually, it isn't. Rance-Rid sales have been built on one-ounce samples. Just one ounce treats 20 gallons of soluble oil emulsion . . . Try it—at no cost. Your inquiry brings the sample.

HERSEN CHEMICAL CO.

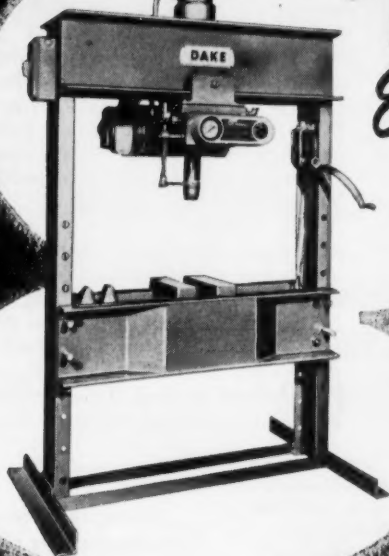
825-E FISHER BLDG., DETROIT 2, MICH.

For more data circle 456 on Reader Service Card



Your Inquiry
brings this
**FREE
SAMPLE**

New!



DAKE *Elec-draulic* PRESS

- ▶ OPERATES
EASIER, FASTER
- ▶ COSTS
LESS

Here is a completely new electric-hydraulic forcing and straightening press, with construction and operating advantages never before offered in a low-cost shop press.

These are a few of the features :

✓ **Rapid Ram Approach**
Automatically changes to power stroke when it contacts the work.

✓ **Variable Ram Speed**
From zero to maximum under fingertip control.

✓ **Movable Workhead**
Self-contained—easy to center over the work. Workhead can be purchased separately.

✓ **Modern Design**
All operating controls at convenient working height.

**DAKE
PRESSES**

These and dozens of other features are fully described and illustrated in new Bulletin No. 347, which we will send promptly on request.

DAKE Engine Company, 612 Seventh St., Grand Haven, Mich.

For more data circle 457 on Reader Service Card

new shop equipment . . .



Peterson Automatic Wet Grinder in use

workpiece to be loaded straight down by means of an overhead hoist or crane. Larger work is positioned by resting it

directly on a horizontal locating rail, with smaller work being positioned on a work table which is preset on the same rail. The locating rail runs directly beneath and parallel to the path of the grinding wheel, resulting in automatic longitudinal alignment of all work.

Lateral alignment is said to be easily accomplished by hand setting a single adjusting screw and checking with a built-in 24-inch protractor. Since the machine affords a full view of the work at all times, the operator can make a quick visual inspection at any point in the operation.

The machine incorporates a unique centrifugal-force-flush coolant system which forces the coolant, under pressure, down through the hollow shaft of the spindle motor and on down through a hollow spindle and over a baffle that distributes it out in all directions over the working surface. This "inside-out" action, it is claimed, results in thorough



PROVEN IN 101 practical shop and production applications!

For Precision

DUPLICATING

With any LATHE, PLANNER, BULLARD — with any type of tool



Write for Catalog, Engineering Bulletins, and help on any Duplication Problem

Air Control Division



Engineers and Manufacturers
1514 Lehigh Drive
EASTON, PENNA.

IT WILL PAY YOU TO INVESTIGATE THIS SIMPLE

LOW COST

Heavy Duty Tool

Cuts duplicating time from hours to minutes. No complicated Hydraulic or Electronic controls. Requires no permanent lathe alterations. Uses easily made, low cost templates. Unlimited radii, threading, steps, facing, grinding, boring—on any metal. Models to fit lathes of all sizes.



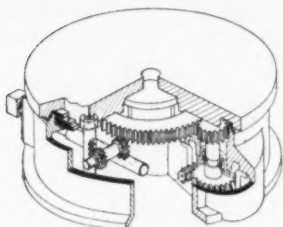
M-1500
WITH
ROTARY
STYLUS

For more data circle 458 on Reader Service Card



new

HYDRAULIC INDEX TABLE WITH BUILT-IN SAFETY FEATURES



✓ **SIMPLE DESIGN**

Merely a worm and a worm gear.
Notice the cut-away drawing.

✓ **COMPLETELY HYDRAULIC OPERATED**

The Index Table is driven by a fluid drive motor to provide smooth operation.

✓ **PROVIDES YOU MAXIMUM SAFETY**

Electrical failures in any unit—engaging fixtures with drill head, while the table is in operation—stops the table automatically.

Now available in four sizes—20", 30", 42" and 60"
Can be bored for any number of stations (2 to 15)

Michigan

DRILL HEAD CO. Detroit 34, Michigan
engineers and manufacturers of production machines and drilling equipment

For more data circle 459 on Reader Service Card

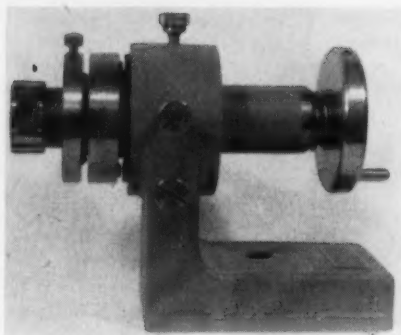
new shop equipment . . .

flushing and cooling and permits the use of the unusually large 5-inch faced, flat-dressed, 16-inch grinding wheel. For more data circle 18 on Reader Service Card

★ ★ ★

DEVICE FACILITATES GRINDING OF RADIAL RELIEF ON SMALL TOOLS

For grinding taps, reamers, counter-sinks, step drills, gun drills and engraving tools, Atlantic Engineering & Mfg. Co., Inc., 63 Myrtle St., Worcester, Mass., has announced the "Radial Reliever" Grinding Fixture which facilitates the grinding of radial relief on 1, 2, 3, 4, or 6-flute tools, either right or left-hand. The unit utilizes a graduated dial which allows instantaneous



Atlantic "Radial Reliever" Grinding Fixture

setting for the correct number of flutes to be ground. Two adjusting screws provide an instantaneous change from right to left-hand operation. A unique cam arrangement affords a means for instantly varying the amount of relief.

When the fixture is used on a sur-

★ ★ ★ ★ ★

DISSTON
HAS THE EDGE.

in hack saw blades

Here are the sharpest, cleanest cutting machine hack saw blades ever made! They are completely new—made by new methods, newly designed equipment. They meet your toughest production requirements for long life and economy.

Ask for the Disston Super-Safe Hack Saw Blades!

Get your Disston Distributor to make a comparison test in your shop—on your machines. Let practical results—not claims—convince you. Ask him about Disston's complete line of Hand Hack Saw Blades and Frames—and get overall economy.

Send for this FREE production help

Free production man's pocket guide. Tells proper teeth, feed, stroke for best metal cutting results. Write:

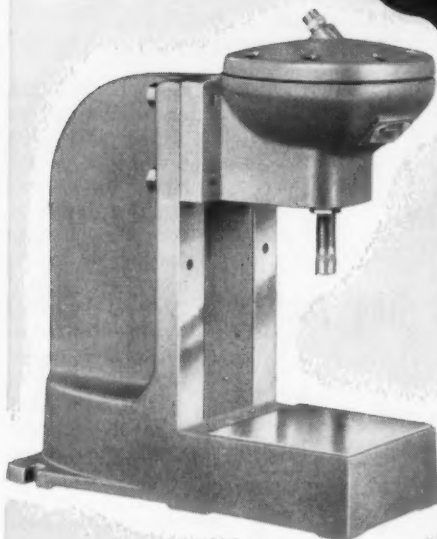
Henry Disston & Sons, Inc., 321 Tacony, Philadelphia 35, Pa., U.S.A.
Other factories and branches: Toronto, Seattle, Chicago.

For more data circle 460 on Reader Service Card



NEW!

Speedy



1 TON *Heavy Duty* AIR PRESS

No. 80

only **\$85**

This useful, high quality AIR PRESS is the last word in air power engineering—the result of 34 years of specialization in diaphragm compression. Extremely sturdy, it does dozens of jobs formerly handled by expensive presses—and does them more quickly, easily and economically. Operated by Speedy Foot Control, Hand, or Fingertip Valves. Order from your mill supply house or write direct.

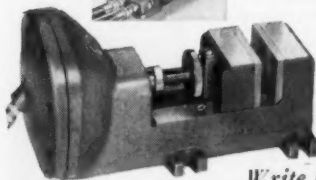
- ★ Heavy grey iron casting, machined surfaces.
- ★ Power factor—15 times air line pressure of 5 to 150 lbs.
- ★ Throat clearance to center of 10" diam. circle.
- ★ Ram clearance 0 to 5", stroke $\frac{5}{8}$ ", table 5" x 5".



◀ SPEEDY AIR VISE No. 60

New improved design. Jaws open to 3". 15 times air line pressure. Complete with Foot Control Valve, Air Hose and Fittings.

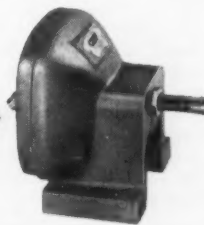
\$44.00



SPEEDY AIR RAM No. 70 ▶

Mounts in any position. Compact, extremely sturdy. Exerts gentle pressure to one ton thrust. 6½" high, 5¾" wide.

\$35.00



Write For New Complete Catalog

W. R. BROWN CORP., 2649 N. NORMANDY AVE., CHICAGO 35, ILL.

AIR REGULATORS • AIR VALVES • AIR FILTERS • PAINT SPRAYERS • AIR COMPRESSORS

For more data circle 461 on Reader Service Card

new shop equipment . . .

face grinder or a tool and cutter grinder, rotation of the handwheel advances each flute into the grinding wheel, thus providing controlled uniform radial relief. The unit is available in two models; namely, the Junior Model which uses Jacobs Rubber-Flex collets and which has a capacity up to 1/2-inch

shank diameter and the Senior Model with a capacity up to 1.020-inch shank diameter utilizing 5-C collets.

For more data circle 19 on Reader Service Card

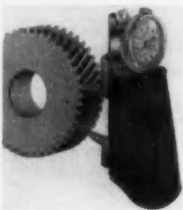
★ ★ ★

DIAL CALIPER INSPECTS GEARS BY SPAN SYSTEM

Sensory Devices Co., P. O. Box 204, New Vernon, N. J., has announced the

"Span" Dial Caliper which is designed for the production line inspection of spur or helical gears by the "Span" system. According to the manufacturer, spur or helical gears having odd or even numbers of teeth can be measured accurately at rates up to 20 per minute with the instrument. The unit is light in weight and has good balance. A plastic grip protects against heat transmitted from the hand.

The caliper utilizes an adjustable

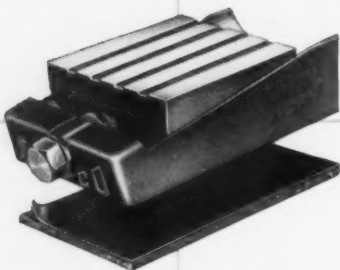


"Span" Dial Caliper in use

with

EMPCO

leveling jacks



MACHINES PERFORM BETTER!

Set your machines level—and keep them that way! That's the key to better performance and less maintenance! EMPCO Leveling Jacks provide a solid, adjustable support for machine tools, industrial furnaces, tool room and production equipment of all types. Easily installed and relocated, EMPCO Jacks keep your machines level and stable.

VI-SORB mounting pads are optional with EMPCO Jacks. They control vibration from within the machine itself, and reduce transmitted vibrations.

Available in two styles and 6 models, there's an EMPCO Jack for your every requirement. Write today for complete information and illustrated bulletin!



THE ENTERPRISE MACHINE PARTS CORPORATION

2715 JEROME AVENUE

DETROIT 12, MICHIGAN

For more data circle 462 on Reader Service Card

2 new frames

COLORFUL FUNCTIONAL DESIGN

The new Victor No. 10 and No. 15 frames fit either 10-inch or 12-inch blades, yet are built around a solid, one-piece steel backbone, the most rigid construction ever devised. New under-the-handle lever-lock automatically — instantly — puts correct tension on every blade. Colorful molded Tenite handles appeal to eye and hand.

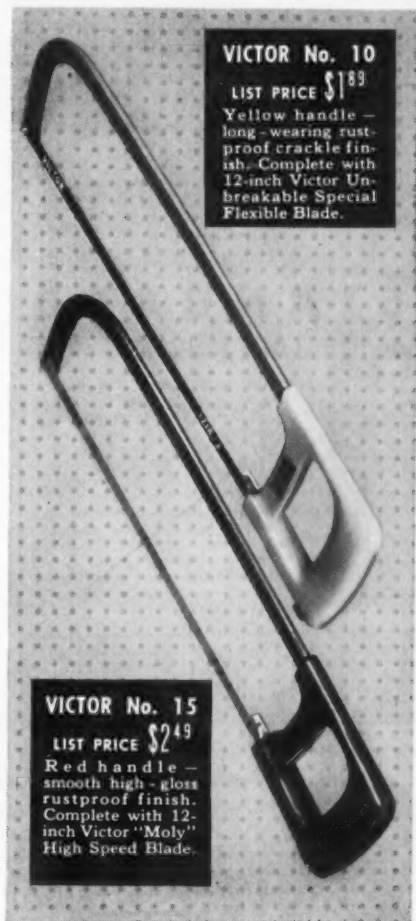
VICTOR No. 20

LIST PRICE \$3²⁵



Long-time mechanics' favorite. Adjustable for 10-inch or 12-inch blades. Extra-leverage tension lock.

**Sold Only Through
Recognized Distributors**



VICTOR No. 10

LIST PRICE \$1⁸⁹

Yellow handle — long-wearing rust-proof crackle finish. Complete with 12-inch Victor Unbreakable Special Flexible Blade.

VICTOR No. 15

LIST PRICE \$2⁴⁹

Red handle — smooth high-gloss rustproof finish. Complete with 12-inch Victor "Moly" High Speed Blade.

VICTOR

1414

SAW WORKS, INC. • MIDDLETOWN, N.Y., U.S.A.

Makers of Hand and Power Hack Saw Blades; Frames; Metal & Wood Cutting Band Saw Blades.

For more data circle 463 on Reader Service Card

March, 1955

MODERN MACHINE SHOP 259

new shop equipment . . .

anvil which is guided by hardened, ground and lapped inverted V-way. The weight of the gage and hand is claimed to be supported on the work by the rigidly-locked adjustable anvil. The movable anvil is fastened to a frictionless parallelogram mechanism

which is machined from the solid gage frame. There are no springs, pivots or levers. Movement of the movable anvil is transmitted to the dial indicator by a simple straight-line-action push rod. The dial indicator reads pitch line (normal to the helix) backlash directly. An indicator for reading base backlash directly can also be supplied.

For more data circle 20 on Reader Service Card

★ ★ ★

MAGNETIC CHUCK HAS EVEN DISTRIBUTION OF MAGNETISM ON MAGNET FACE

Designated as the "Crow Foot" Model, an electro-magnetic chuck, available in 10 and 12-inch diameters for application on lathes, grinding machines and special machines, has been announced by Magnetic Holding Devices, 2034 E. 22nd St., Cleveland 15, Ohio. According to the manufacturer, the important features of the chuck are its low weight ratio to its face diameter and its even distribution of magnetism on the magnet face, assuring maximum pull-down of thin work and a powerful grip on work which only has small engaging surfaces. Good distribution of magnetism is said to be attributed to the magnetic pattern of the face, called the Crow Foot. The pattern has 48 radial magnetic gripping edges equal to 91 lineal inches of magnetic engagement on a 10-inch diameter face. The



MARK OF QUALITY

STANDARD

TAPER PINS



● The high quality and accuracy of Standard Steel Specialty Taper Pins have won them wide acceptance. Milled from bar stock, straight to taper and to extremely close tolerances, these pins give 100% performance. The uniformity and accuracy of the pins saves valuable time at assembly, assuring you trouble free service. Write for complete catalog giving information on taper pins. Woodruff keys, machine keys and machine racks.

STANDARD STEEL SPECIALTY CO.
BEAVER FALLS • PENNSYLVANIA
Plant: Beaver Falls, Pa.; Hammond, Ind.

For more data circle 464 on Reader Service Card



You Need an Extra Hand Now to Speed Up Production!

HEIMANN TRANSFER SCREW SETS

Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money tool

IN 11 SIZES—No. 6 to 1"
N.C. In all S.A.E. sizes.

HEIMANN MFG., CO. • URBANA, OHIO

For more data circle 465 on Reader Service Card

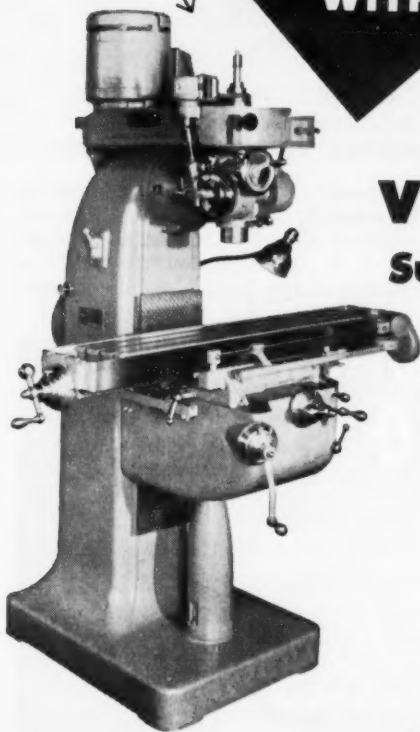
Again INDEX

STEPS FAR OUT
IN FRONT
WITH

the New
SUPER 55

VERTICAL MILL

**Super Power, Capacity
Rigidity, Precision**



Always in the Lead through constant improvements, Index announces this outstanding machine that will give you super performance in your BORING, MILLING and DRILLING operations—1½ H. P. Head—New spindle brake, Dynamically Balanced Cast Iron Pulleys and Drive System give 50% more capacity. Many more advantages. Get the facts. Write for Literature today.

OTHER MODELS—A COMPLETE
LINE FOR YOUR EVERY REQUIREMENT

INDEX MACHINE Co.

544 N. MECHANIC STREET

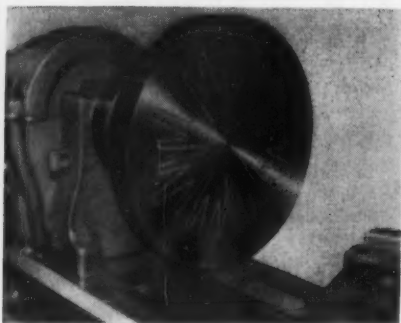
JACKSON, MICHIGAN

Visit Our Booth 712, A.S.T.E. Tool Show, Los Angeles, March 14-18
For more data circle 466 on Reader Service Card

March, 1955

MODERN MACHINE SHOP 261

new shop equipment . . .



"Crow Foot" Model Electro-Magnetic Chuck

great number of radial magnetic lines and their closeness, is claimed to produce a strong grip on work.

The face of the magnet, except for the magnetic lines, is made of steel to

assure long life. The magnet is readily adapted for mounting on small or large-size spindles. It comes equipped with a Permafil treated magnet coil to stand up under coolants, oils, mild acids and alkalis. The magnet operates on 6 volts d.c., and current is obtained from a power supply which has a panel-mounted Mag Demag switch. The complete package includes the magnet, power supply unit and collector rings.

For more data circle 21 on Reader Service Card

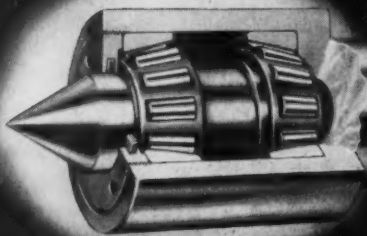
★ ★ ★

CARBIDE-TIPPED STEP CUTTER MACHINES NON-FERROUS METALS, PLASTICS AND WOOD

Onsrud Cutter Mfg. Co., 800-820 E. Broadway, Libertyville, Ill., has announced a carbide-tipped step cutter which is recommended for the machining of non-ferrous metals, plastics

...precision performance-ALWAYS!

Falls **ROTO CENTER**



**for
lathe and grinder
tail stocks**

Accurate, low cost turning on tough continuous-run work. Preloaded, matched roller bearings assure rigid set-up. Precision ground shank. Heavy-duty grease seal. Many exclusive features.

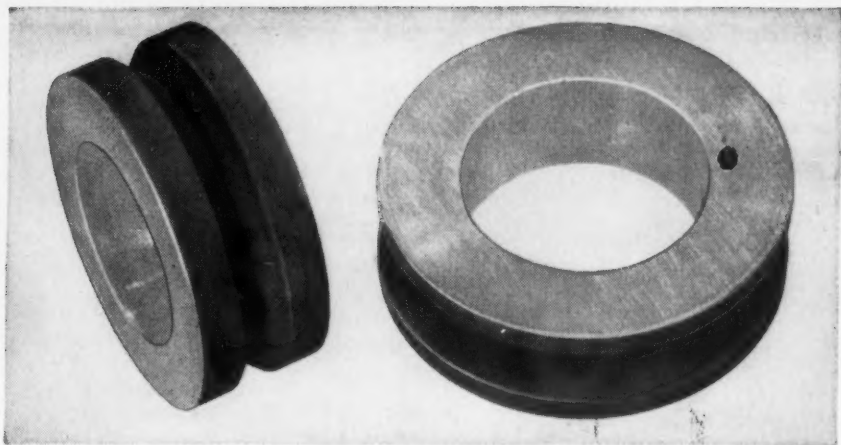


FREE BULLETIN 105

**"What you should know
about LIVE CENTERS"**

FALLS PRODUCTS, INC., 124 Genoa Street, GENOA, ILL., U.S.A.

For more data circle 467 on Reader Service Card



How Flame-Plating keeps **DOWN-TIME** Down

Deep grooves worn in straightening rollers by small diameter wires often badly score larger wires which are passed through the same set-up. The result—costly machine down-time periods are necessary to change rollers. One manufacturer solved this problem by using rollers Flame-Plated with wear-resistant tungsten carbide. Now, machine down-time costs are at a minimum and a better product is produced.

Flame-Plating is a new LINDE process for applying wear-resistant coatings of tungsten carbide to the wear surfaces of parts and many tools made of most common metals. For the full story on how you can solve your wear problems with Flame-Plating, send for new "Flame-Plating" booklet.

LINDE AIR PRODUCTS COMPANY
 A DIVISION OF UNION CARBIDE AND CARBON CORPORATION
 30 East 42nd Street, New York 17, N. Y. ☐☐☐ Offices in Other Principal Cities
 In Canada: DOMINION OXYGEN COMPANY
 Division of Union Carbide Canada Limited, Toronto

The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation.



For more data circle 466 on Reader Service Card

new shop equipment . . .

and wood. High-grade carbon steel is used for the cutter body. The cutters, which are carbide-tipped, may be re-sharpened or retipped when worn. The cutters are staggered on the spindle forming steps which give intermittent cuts, allowing for fast feeds, smooth finish and minimum machine spindle

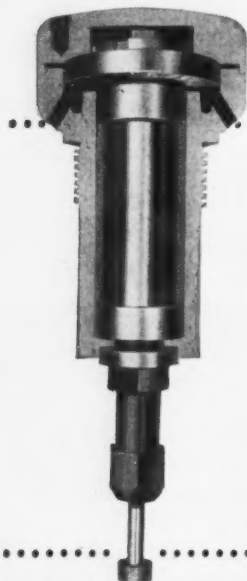
strain. Cutters may be stacked to any desired height. If so desired, the cutters could be ground with side clearance for use in other operations.

For more data circle 22 on Reader Service Card

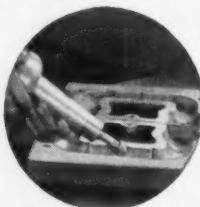
★ ★ ★

UNIVERSAL TAPER-BORING HEAD

Designated as the Model "D," a universal taper-boring head which is designed to eliminate special tool setups and which provides efficient, precision performance has been announced by John Kis Mfg. Co., Racine, Wis. The head can be adapted to a jig borer, milling machine or a horizontal boring bar with a simple tapered or flanged-type adapter. According to the manufacturer, the tool may be used for taper bor-



air turbine
speed
for
low
cost
grinding



Onsrud

PORTABLE
AIR
TURBINE
GRINDERS

Cool, expanded air and light weight provides easy handling. High rpm permits use of small diameter wheels—savings in wheel costs. Grease packed for life bearings—provide minimum of maintenance. For the toolroom, die room and assembly line.

ONSRUD MACHINE WORKS INC.

3924 Palmer Street
Chicago 47, Illinois

write for Bulletin 1129



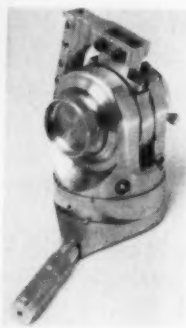
B-18
AIR TURBINE
GRINDER
75,000 RPM



D-1A
AIR TURBINE
GRINDER
50,000 RPM



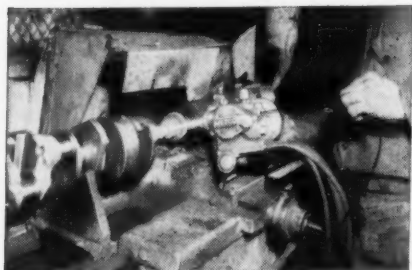
E-1A
AIR TURBINE
GRINDER
38,000 RPM



Kis Model "D"
Universal Taper-
Boring Head

For more data circle 469 on Reader Service Card

when mistakes happen...



Automotive crankshaft being brought up to inspection standards with metallizing. This automotive manufacturer formerly used plating for this type of salvage, worked one per hour. With metallizing, the salvage operation requires only 5 to 10 minutes per shaft, including surface preparation.

...and they do in any busy machine shop, there's no need to scrap a mis-machined or otherwise damaged machine part that represents an investment of many expensive man-hours.

Parts like these are brought up to inspection standards quickly, easily and inexpensively with metallizing.

And with the new molybdenum metallizing wire, Sprabond, the only surface preparation required is cleaning. The molybdenum forms a molecular bond with the surface being rebuilt. Little heat is generated, eliminating any danger of warpage.

What's more—users have found that the extreme hardness of the molybdenum coating, and its microscopic porosity which provides superior lubricating characteristics, improve its "wear-ability" over ordinary bearing surfaces as much as 25 times. **You haven't just salvaged a part—you've improved it.**



Free Bulletin

Get the full story on metallizing in production salvage. Bulletin 57-C describes and illustrates the procedures, provides data on typical parts, with interesting photo-micrographs showing the unique bonding action of Sprabond Wire. Send for a copy.

The trade name, SPRABOND WIRE, is the property of Metallizing Engineering Co., Inc.

DON A. WATSON
METALLIZING ENGINEERING CO., INC.
1111 Prospect Ave., Westbury, Long Island, N. Y.

☐ Please send me Bulletin 57-C.

☐ Please have Metco Field Engineer call.

Name _____

Company _____

Street _____

City _____

Zone _____ State _____



Metallizing Engineering Co., Inc.

1111 Prospect Ave., Westbury, L. I., New York • cable: METCO

In Great Britain:
METALLIZING EQUIPMENT COMPANY, LTD.—Chobham near Woking, England

For more data circle 470 on Reader Service Card

new shop equipment . . .

ing, taper turning, backfacing, beveling, grooving, straight boring and counterboring. In all operations, regardless of size, the workpiece invariably remains stationary and the head revolves with the spindle. The inner workings of the device actuate the tool in the position in which it is set.

The body of the boring head is graduated to facilitate precise and controlled cutting.

For more data circle 23 on Reader Service Card

★ ★ ★

5-TON OPEN BACK INCLINABLE PRESS FEATURES DEEP THROAT

Service Machine Co., 2310 W. 78th St., Chicago 20, Ill., has announced the

Rousselle Model O.F. 5-Ton Open Back Inclined Punch Press which features a 9-inch throat, thus permitting working to the center of 18-inch wide sheets.

According to the manufacturer, the frame of the press is an extra-heavy semi-steel casting with a 6-inch opening through the back. The double-wall

YESTERDAY'S PIONEER . . . TODAY'S LEADER

Just what you need for your TOOL ROOM...

These handy sets fill an important need in every tool room. The convenient block protects tools against damage or mislaying and keeps them together with each size in place, always available for instant use.

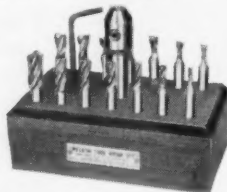


WELDON CORNER ROUNDING END MILL SET

This set consists of block with 8 end mills in following radius sizes: $\frac{1}{16}$ ", $\frac{3}{32}$ ", $\frac{1}{8}$ ", $\frac{5}{32}$ ", $\frac{3}{16}$ ", $\frac{1}{4}$ ", $\frac{5}{16}$ ", $\frac{3}{8}$ ".

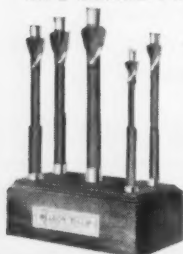
WELDON TOOL ROOM END MILL SET

This set consists of block with 14 small end mills, in sizes from $\frac{1}{16}$ " to $\frac{1}{2}$ ". Also one Weldon Holder No. H1-2 with No. 7 B & S Shank.



WELDON "TU-LIP" COUNTERBORE SET

Here you have your choice of 3 sets, made up of stock sizes from $\frac{1}{4}$ " to $\frac{3}{4}$ ". Set No. 1 . . . Straight Shanks—Short Type; Set No. 2 . . . Straight Shanks—Long Type; Set No. 3 . . . Morse Taper Shanks.

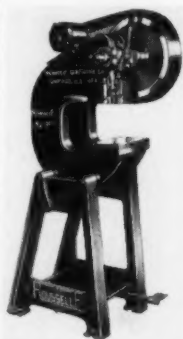


Weldon distributors throughout U. S. A. and Canada carry complete stocks to serve you

THE WELDON TOOL COMPANY

3000 WOODHILL ROAD . . . CLEVELAND 4, OHIO

For more data circle 471 on Reader Service Card



Rousselle Model O.F. 5-Ton Open Back Inclined Punch Press



NOW'S THE TIME FOR A *Burr-Master**

*Reg. Pat.
Pending

Yes, when your production gears need deburring and chamfering your answer is a Burr-Master. Capable of chamfering the entire tooth form and root, Burr-Masters are available in a wide range of models to meet every need. No matter what the length of your production runs or the size gears to be chamfered, the

Universal Burr-Master (shown) holds the answer to many of your finishing problems. The newest member of the Burr-Master line, it handles both spur and helical gears as well as straight and involute form external splines.

Complete details in Bulletin 103-60. Ask for it.

14230 BIRWOOD AVE.

MODERN

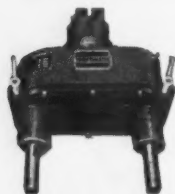
DETROIT 38, MICHIGAN

Industrial Engineering Co.

For more data circle 472 on Reader Service Card

Yes!...
THRIFTMASTER
makes ALL TYPES
of DRILLHEADS

Universal Joint Drill-head . . . Full Ball or Bronze Bearing Construction. Standard and Heavy Duty. From 1/2" Minimum Centers up. Capacities to 1" in Steel.



Gear Driven Eccentric Type Adjustable Drill-head . . . Enclosed, Full Ball Bearing Construction.

Special Fixed Center Drillhead . . . Full Ball Bearing Construction.



- We Stock or Can Build the Right Drillhead for Your Job.
- Write for Complete THRIFTMASTER Catalog or phone for a rush, on-the-spot quote.

Subsidiary of
 Thomson Industries, Inc.



THRIFTMASTER Products Corporation

1034 N. PLUM ST.,
 LANCASTER, PENNSYLVANIA

Also Makers of
DORMAN AUTOMATIC REVERSE TAPPERS

For more data circle 473 on Reader Service Card

new shop equipment . . .

frame provides maximum strength and rigidity. The Model O.F. also features a large opening in the bed for ample slug clearance. The flywheel, it is claimed, operates at a speed of 250 r.p.m., providing fast operation. The press has a die space of 7 1/2 inches and standard stroke of 1 1/4 inches.

For more data circle 24 on Reader Service Card

★ ★ ★

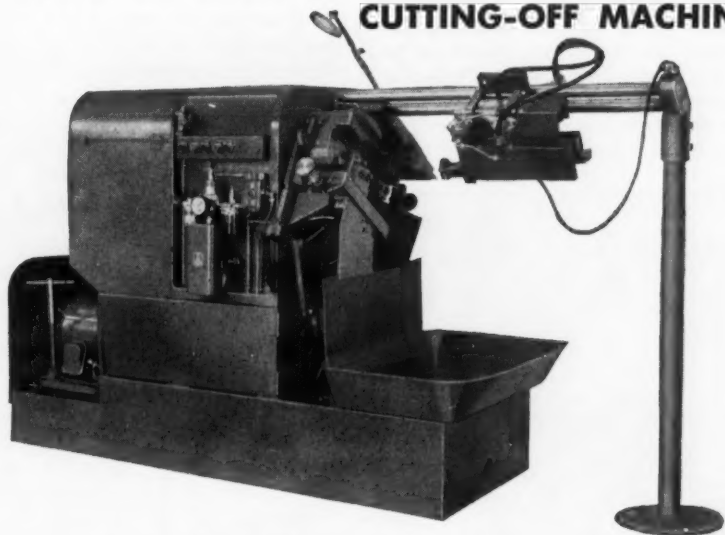
SAFETY AND PRODUCTIVITY
IMPACT POSTER SLIDES
AND PROJECTORS

To reinforce the efforts of the supervisory organization in developing productive employee attitudes and reducing manufacturing costs and accidents, Poster Slide Co., 10 E. Kinzie St., Chicago 11, Ill., has announced a medium of employee education; namely safety and productivity impact posters on full



Admatic Automatic Slide Projector in use

THE MODERN AUTOMATIC CUTTING-OFF MACHINE



Cuts Off Tubing, Pipe and Shafting . . . FAST

Cuts off longer pieces than a regular automatic machine. In fact, cuts off *any length you want*—and cuts it *faster*. If your production requires quantity cutting-off of tubing, pipe or shafting, check the figures below against your present time.

1/2" Tubing

This machine cuts off and chamfers both outside edges of 1/2" .030 wall tubing, 5' long at the rate of one every 2.5 seconds.

1 1/4" Cold Rolled

This machine cuts off and chamfers both ends of 1 1/4" cold rolled, 20' long, at the rate of one every 20 seconds.

1" Tubing

This machine cuts off and chamfers both outside edges of 1" of 3' long, at the rate of one every 3 seconds.

These popular, time saving machines are now available in four sizes, handling work up to 6 3/4" O.D. Their many cost cutting features are described and illustrated in our latest catalog that will be mailed promptly on request.

WRITE FOR ILLUSTRATED CATALOG

MODERN MACHINE TOOL CO.
Jackson, Michigan

For more data circle 474 on Reader Service Card

new shop equipment . . .

natural color 2 by 2 Kodachrome slides which are projected from behind a special translucent plastic screen in an Admatic Automatic Slide Projector. Identified as "Automatic Education," the poster slide program is continuous, consisting of a monthly program of 30

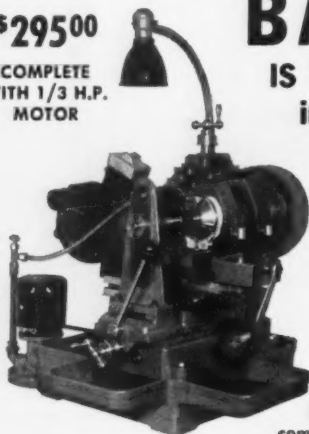
impact poster slides projected automatically on a 7-second interval in the projector.

In action, 15 poster slides on a safety subject are intermixed with 15 slides on a productivity subject for continuous showing automatically, eight hours a day, 24 hours a day or at predetermined intervals of an hour or two at lunch periods or shift changes. The

projector has a stop-and-go control which permits "freezing" any poster slide at any time so that it may be held in position for discussion. This is especially valuable in safety meetings. Subjects included in the program include safety topics, such as "Be Alert," "Good House-keeping," "Falls," "Correct Lifting," "Sight Savers," "Hand Tools," "Safety Styles," "Follow Safety Rules" and "Play Safe Today." Productivity subjects include "New Ways Work," "We Are All Salesmen," "Stop Waste," "Work Together," "Your Job Is Important," "Be a Good Neighbor," "Compete Better to Live Better," "Keep Equipment Running," and

\$295.00

COMPLETE
WITH 1/3 H.P.
MOTOR



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General Motors
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Co.
Bulova Watch Co.
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Corp.

BARKER IS YOUR BEST BUY in a BENCH MILL

Just

- ✓ Check the price
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Special Accessories on
model shown here avail-
able at slight extra cost.

Hundreds of Barker mills
in operation and not one
complaint. It's a pretty strong
statement, but true.

Every BARKER is precisely and
sturdily built. A "work horse" on any
bench.

Today, BARKER MILLS are perform-
ing various machining operations in
hundreds of diversified industries,
large and small.

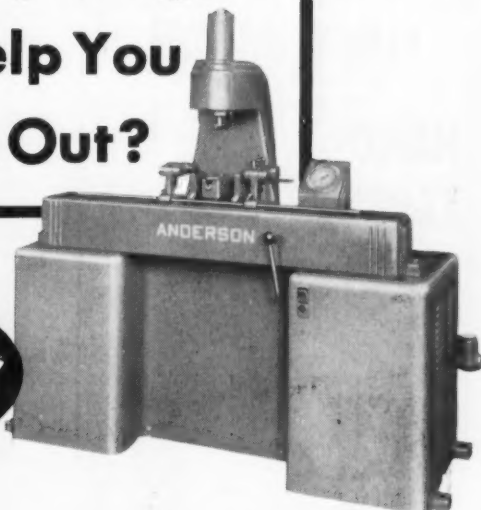
Rather than attempt to tell all
here, we'd like to mail you the "BARK-
ER" story with complete information
on specifications, operational features,
special accessories and the list of
many users, many doubtless in your
particular field.

WRITE TODAY FOR LITERATURE

BARKER ENGINEERING COMPANY
500 GREEN ROAD CLEVELAND 21, OHIO

For more data circle 475 on Reader Service Card

Is There Anything We Can Help You Straighten Out?



CHECKS AND BENDS IN THE SAME POSITION

Manufacturers with straightening, checking, and truing operations that require more than ordinary speed and accuracy have found Anderson Power Presses to be the answer to their problems. Here are the results they report:

"Straightened 30 pieces per hour with former equipment. With Anderson Press, 120 per hour. Production increase 400%."

"Anderson Power Press with its complete attachments is definitely more flexible for all types of straightening operations. It is faster, more accurate, and pressure is easily controlled. It is simple to operate."

"Formerly had a tolerance on drawing of plus or minus .002". After installing Anderson Press changed drawings to plus or minus 1/2 thousandth."

These actual reports from users prove that with an Anderson Power Press you get it straight — fast. Profit from low-cost high production, precision straightening.

Write for Bulletin 3-22.



ANDERSON BROS. MFG. CO.
ROCKFORD, ILLINOIS

For more data circle 476 on Reader Service Card

NEW ALLMAN FLOOR MODEL

HAND- TAPPER



*for toolroom
or production-*

Large T-slot table, machine vise and holding tools—articulate arm (adjustable height) and assortment of tap spindles permit tapping of an infinite number (and number of sizes) of holes without changing set up of work on table. Convenient bench-high bed on Cast floor legs. Movable pedestal has ground column with positioning clamp nut. Spindles guided perpendicular in wide bushing guide.

Write for Circular

TOOLS, INC.

1734 NORTH 25TH AVENUE

MELROSE PARK

ILLINOIS

For more data circle 477 on Reader Service Card

new shop equipment . . .

"Produce for Prosperity." The projectors may be purchased on either an outright purchase or rental-purchase plan. Poster slides are sold outright either in a bulk "library" of sets or on a monthly subscription plan.

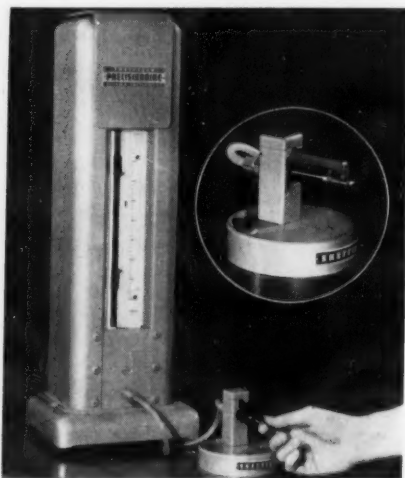
For more data circle 25 on Reader Service Card

★ ★ ★

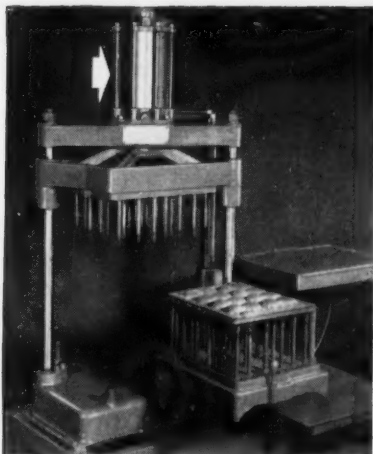
GAGE IS DESIGNED FOR QUICKLY AND ACCURATELY CHECKING SMALL PARTS

A Precisionaire Gage for the fast, accurate inspection of tiny television, radio and electrical components is now being manufactured by The Sheffield Corp., Dayton 1, Ohio. The accompanying illustration shows the gage being used to inspect the 0.078-inch inside width of a television tube component.

The gage is simple to use, requiring no special skills, know-how or calculations. In operation, the part is slipped

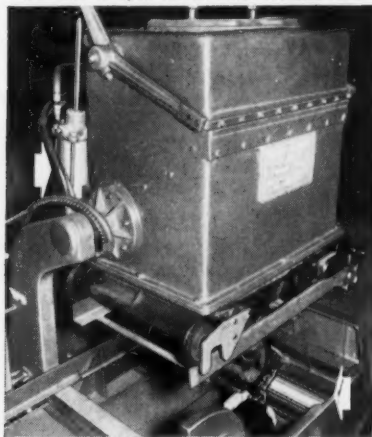


Sheffield Precisionaire Gage in use



Shell Process Bonding Machine Equipped with NOPAK 8" Model D Cylinder.

This machine which produces shell molds employs 2 NOPAK Cylinders to invert investment box and to open louver which releases mix.



SHELL PROCESS Equipment Utilizes **NOPAK** Cylinder Power

Builder of "Shell Molding" Equipment . . . Shell Process, Inc., of Chicopee, Mass., employs NOPAK Cylinders in a number of its machines to provide the controlled power necessary for their successful operation.

The top illustration shows a bonding machine utilizing the shell molds produced in the machine pictured below. An 8" Model "D" NOPAK Cylinder advances and retracts the upper pressure plate which, in turn, applies the pressure, through pins and springs, required to seal the two halves of the shell mold before molten metal is poured between them.

The lower picture shows a machine which produces shell molds by the investment process, employing a 4" NOPAK Cylinder to operate the louver of the investment box containing the sand and resin mix which is deposited on the heated pattern. A 6" NOPAK Cylinder, visible in base, rotates the investment box 210°.

Whether you build machines for resale, or for use in your own plant, NOPAK Cylinders and Valves can be used to your advantage in the efficient application and control of fluid power.

GALLAND-HENNING NOPAK DIVISION

2578 SOUTH 31ST STREET

MILWAUKEE 46, WISCONSIN

Visit Booth 750 • A.S.T.E. Show
Los Angeles, March 14-18

Representatives
in Principal Cities.

NOPAK

VALVES AND CYLINDERS

DESIGNED for AIR and HYDRAULIC SERVICE

For more data circle 478 on Reader Service Card

A 8270-1/2 IA

March, 1955

MODERN MACHINE SHOP 273

new shop equipment . . .

over a chrome-plated spindle incorporating a single air jet and held in position by a small hold-down wheel. Instantly, the position of the float in the air column indicates whether the width is in tolerance of the amount it is oversize or undersize. Other Precision-

aire gages are available for checking inside and outside diameters, concentricity, runout and other dimensions.

For more data circle 26 on Reader Service Card

★ ★ ★

INSTRUMENT COMPARES PARALLELISM

A precision angle comparator that has wide applications in machine shop

and metal working departments for comparing parallelism between two surfaces, squareness and angles, is now being manufactured by The Perkin-Elmer Corp., Norwalk, Conn. Once the instrument is set up, inspection of finished parts can proceed quickly on a production basis. The comparator operates entirely on optical principles. No pressure of any kind is applied to

Time Savers for the Tool Room and the Production Line!

Do It Faster With A DREMEL MOTO-TOOL

With DREMEL you can polish, grind, de-burr, sharpen without tearing down set-ups. Moto-Tool is the fastest, most powerful tool in its class. Easy to use as a pencil (dynamically balanced and weighs only 13 oz.). Put the DREMEL to work. See how it pays off in speed, convenience and time savings!

**APPROXIMATELY
27,000 R.P.M.**

MOTO-TOOL NO. 2, with one emery wheel point. \$17.85

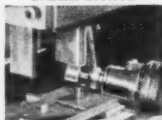
MOTO-TOOL KIT NO. 2, with 23 accessories (high speed steel cutters) and Model 2 Moto-Tool in sturdy steel case. \$25.95



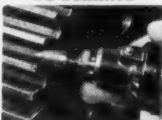
GRINDING



SHARPENING

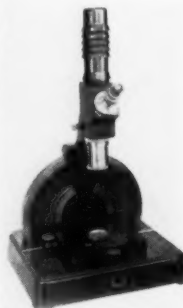


DE-BURRING



See Your Nearby Industrial Distributor or write for catalog.
DREMEL MFG. CO., Dept. 225-C, Racine, Wis.

For more data circle 479 on Reader Service Card



Perkin-Elmer Angle Comparator

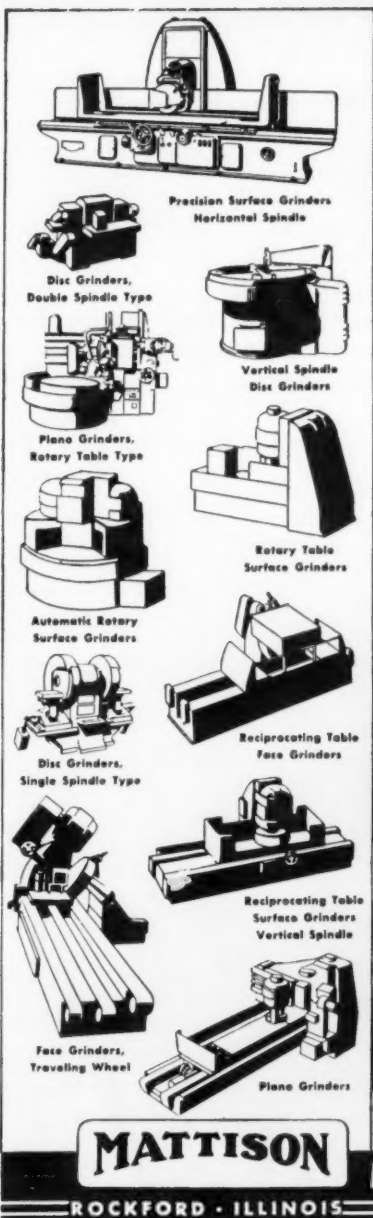
MATTISON GRINDERS

*If it's a Flat Surface to Grind
There's a Mattison to Grind it.*

● With the addition of the production grinding machinery formerly made by the Hanchett Manufacturing Company, Mattison now is in a position to work with you on all your surface, face and disc grinding problems. These machines are made in various types to handle a wide range of work. Experienced fixture engineers are available to give you best production efficiency with Mattison Machines.

For any flat grinding, ask for our recommendations on the proper method and machine for your job. No obligation, of course.

For catalog on all machines, ask for free copy of general bulletin.



Precision Surface Grinders
Horizontal Spindle

Disc Grinders,
Double Spindle Type

Vertical Spindle
Disc Grinders

Piano Grinders,
Rotary Table Type

Rotary Table
Surface Grinders

Automatic Rotary
Surface Grinders

Disc Grinders,
Single Spindle Type

Reciprocating Table
Face Grinders

Reciprocating Table
Surface Grinders
Vertical Spindle

Face Grinders,
Traveling Wheel

Piano Grinders

MATTISON

ROCKFORD - ILLINOIS



40 hours before — now 4 hours. Pump now ground on Mattison Horizontal Spindle Precision Surface Grinder



320 surfaces of cast iron compression heads per hour, removing 1/32" stock with Mattison No. 24 Rotary Surface Grinder



900 connecting rods per hour, using 40 station fixture to finish grind crank and wrist pin and of assembled rod with Mattison No. 72 Grinder



Shows variety of work run on Mattison Face Grinders

MACHINE WORKS

For more data circle 480 on Reader Service Card

Bend all these...

with a

HOSSFELD

UNIVERSAL®

IRON BENDER

Rounds

Pipe • Flats

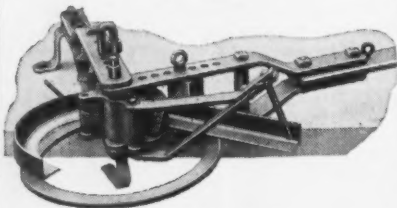
Conduit, rigid & thinwall

Squares

Tubing, O.D.—copper, brass,
aluminum, steel, stainless steel

Angle iron, flange in or out

Bar Stock



The Hossfeld Wrenchless Type Iron Bender is accepted and widely used by metal working shops and factories throughout the world. Being "wrenchless" it can be quickly set up for those 101 different bending jobs called for nearly every day by repair, maintenance and production departments. Makes neat, quick and accurate bends to exact "specs." The Hydraulic Attachment (optional) makes it possible for one man to make those tough, hard-to-pull bends on heavy material. For a better bender specify Hossfeld. Sold through Jobbers everywhere.

GET THE FACTS . . .

Write today for illustrated bulletin.

HOSSFELD
MANUFACTURING CO.

402 W. 3rd Street
WINONA, MINNESOTA

For more data circle 481 on Reader Service Card

new shop equipment . . .

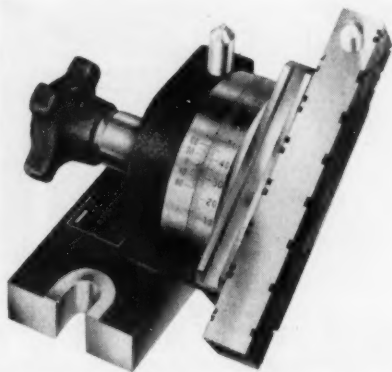
the workpiece being inspected. Among the specific uses for the comparator is the rapid checking of micrometer faces and frames for parallelism and alignment.

For more data circle 27 on Reader Service Card

★ ★ ★

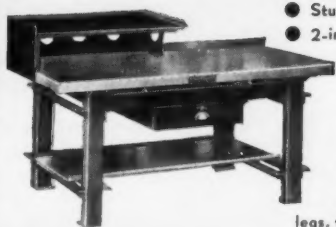
DOUBLE-DUTY TOOL SERVES AS ANGLE DRESSER AND TOOLHOLDER

Designated as the G-2, a versatile double-duty tool which can be used for an angle dresser and a toolholder has been announced by Rothfuss Tool Co., Box 202 Elmwood Station, Providence, R. I. According to the manufacturer, the unit embodies all elements required for angle truing wheel dressing service, or can serve as an efficient, sturdy and accurate toolholder. As an angle dresser, the tool has a graduated, easy-to-read vernier scale, ranging from 0 to 180 degrees, which can be set to within 5 minutes of 1 degree in seconds. As a toolholder, the unit is said to be fast and accurate. It can be



Rothfuss G-2 Angle Dresser and Toolholder

Get Quiet Efficiency like this—



- Sturdy, tool box shelf
- 2-inch warp-proof, shrink-proof, fire-proof Cast iron top
- Steel drawer with pilfer-proof lock
- Lock Leveling Screws on two full length braces
- Convenient bottom storage shelf
- Strong, firmly braced legs, with wheels if desired

all along the line!



For individual use or on a continuous line, Challenge Work Benches help get the job done — faster, easier, more profitably! Works *with* the machinist . . . bringing him better natural (left hand) lighting, wear-resistant top and handy storage facilities. Delivers real service dependability year after year.

A SIZE AND STYLE FOR EVERY WORKSHOP . . . EVERY PURPOSE

In 4 and 6 leg models. 3 styles, with or without shelf or drawer. 4 sizes from 28x48x2 to 28x84x2.

Write for details to

THE CHALLENGE MACHINERY CO.



780

Office, Factories and Show Room
GRAND HAVEN, MICHIGAN

For more data circle 482 on Reader Service Card

new shop equipment . . .

set quickly to any clearance angle desired without the use of wrenches. The unit is designed to accommodate tool bits up to 1-inch square, maintaining

BREMIL
The IMPROVED Compound Lever Shears
**ALL ALLOY
FULLY
GUARANTEED**



PORTABLE
No. 1 cuts up to No. 11 gauge strip or sheet
No. 2 cuts up to 1/4" steel plate.
BREMIL MFG. CO.
1020 Holland St., Erie, Pa.

For more data circle 483 on Reader Service Card

**HAND TAPPING
with
MACHINE
PRECISION**



Adapts for
LATHE USE

59⁵⁰
**F. O. B.
FACTORY**

Just slip a tap adaptor into the Dahlstrom Tap Guide and twist. Your hand tapping will be quick and accurate. For machine tapping, the spindle top is center-bored to fit the tail stock center of a lathe. Size (18" x 8" x 14"). Included 9 adaptors (8-32 to 3/4"). Taps not furnished. Write for pamphlet on tap guides, chucks and autostops.

BRANCH MFG. CO., 15 Olsen Drive, North Branch, Minn.

Dahlstrom TAP GUIDE

For more data circle 484 on Reader Service Card

close tolerances throughout angle grinding, form grinding and other operations.

For more data circle 28 on Reader Service Card

★ ★ ★

PORTABLE SAND BLAST GUN IS ALL-PURPOSE UNIT

Identified as the "Port a Blast," a portable sand blast gun which will operate efficiently on air line pressures



Lindberg "Port a Blast" Portable Sand Blast Gun

ranging from 60 to 150 p.s.i. has been announced by Lindberg Products Co., P.O. Box 885-M, Los Gatos, Calif. The gun is supplied complete with a bottom-mounted can for handling a variety of abrasive material, including silica sand, metal shot, aluminous oxide abrasives, nut shell abrasives and reflective materials in 16 to 1,000 grit sizes. A built-in blast regulator reduces force for delicate work. The gun body is zinc die cast; all wear parts are steel.

JIG BORING
and
Large Precision Machining
Done to your specifications
We Have 13 Jig Borers
KIDDE PRECISION TOOL CORP.
37 FARRAND ST. BLOOMFIELD, N. J.

For more data circle 485 on Reader Service Card



ask your
Bunting
distributor...

**... for ready made bearings
that meet many requirements**

Every size of the 854 different Bunting Bronze stock bearings is selected with scrupulous, painstaking care. Each individual bearing not only fits many common applications in all kinds of industrial machinery but can be altered quickly and economically for many other and unusual requirements.

Bunting®

BRONZE BEARINGS • BUSHINGS • PRECISION BRONZE BARS

THE BUNTING BRASS & BRONZE COMPANY
TOLEDO 1, OHIO
BRANCHES IN PRINCIPAL CITIES

For more data circle 486 on Reader Service Card

HE HAS PLENTY

Your Bunting Distributor carries in stock completely machined and finished Bunting Standard Stock Industrial Bearings, Electric Motor Bearings and Precision Bronze Bars in a complete range of sizes, meeting all your usual production and maintenance needs. You will find him listed in the classified section of your telephone book—most likely under the heading Bars, Bronze or Bearings, Bronze. He is an industrial distributor or a specialist in certain industrial items. Ask him for the Bunting Catalog or write.



new shop equipment . . .

According to the manufacturer, the gun's performance is comparable to that of commercial machines except that the blast covers a smaller area. The unit can be used for many jobs ranging from rust removal to etching. The unit is adaptable for use as a practical liquid blast gun. It is capable of siphoning liquids directly from drums

or tanks using a siphon tube and will blast liquids for liquid cleaning.

For more data circle 29 on Reader Service Card

★ ★ ★

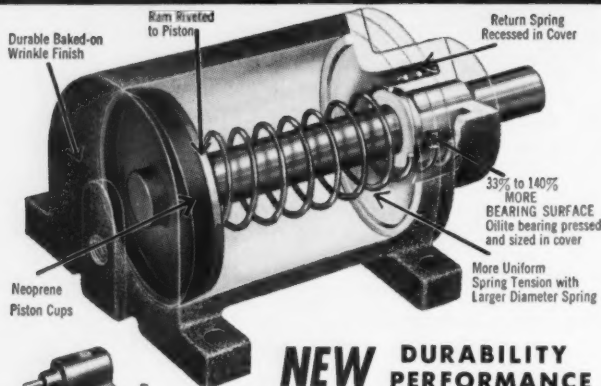
STEEL SHELVING HAS 1,000 COMBINATIONS TO MEET VARIOUS STORAGE NEEDS

A line of steel shelving, whose more than 1,000 different combinations are said to permit the custom assembling

of an installation for virtually all kinds of storage needs, has been added to the Hollowell line by Standard Pressed Steel Co., Jenkintown, Pennsylvania.

The shelving comes with or without sides and back and is manufactured to such close tolerances that components and assemblies are completely interchangeable. Units for the storage of tools or parts, books, towels or almost any temporary or long-time storage item can be bolted side by side for any desired length. The units can also be bolted back to back. All bolts and nuts are cadmium plated as protection against corrosion. The shelving comes in green enamel

Before You Buy ANY AIR CYLINDER—Study this!



NEW DURABILITY PERFORMANCE SIMPLICITY • APPEARANCE

Some of the 26 newly perfected single-acting Air Clamps.

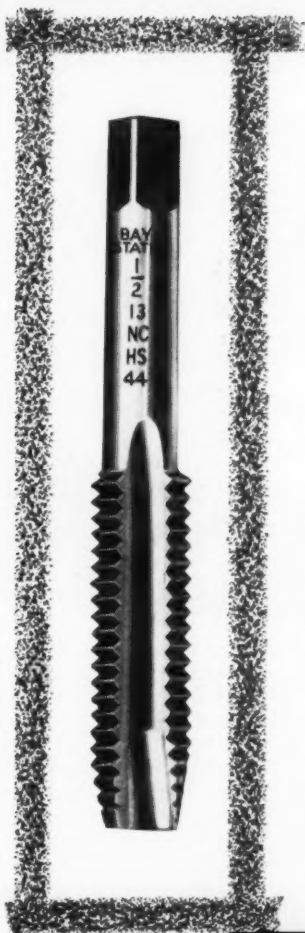
MEAD

Air-Clamp

MEAD SPECIALTIES CO., Dept. AA-35, 4114 N. Knox, Chicago 41
For more data circle 487 on Reader Service Card

See the construction of this newly perfected single-acting Mead® Air Clamp cylinder. Compare with others—you'll switch to Mead! Now all perfected single-acting Air Clamps use less air—to further cut your costs feeding, holding, ejecting, finished pieces. They are in stock at your nearest Mead Man for immediate delivery.

Write to Factory or Nearest Mead Representative
for Bulletin No. AA-35



Taps for production . . .
in all standard and special
sizes . . . are available from
your nearby Bay State Tap
distributor. Gain precision
performance on every
tapping job with controlled
contour taps, made by
BAY STATE TAP & DIE CO.,
MANSFIELD, MASS.

TAPS FOR PRODUCTION...

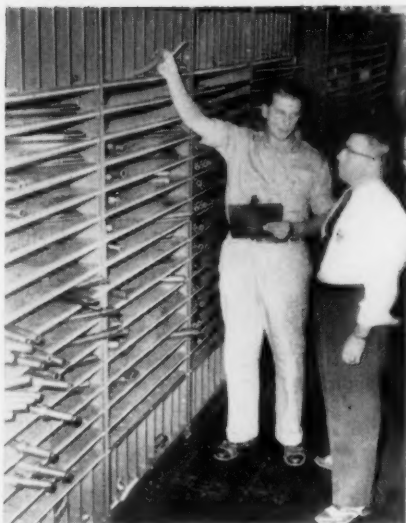
**BAY STATE
TAPS**

For more data circle 488 on Reader Service Card

new shop equipment . . .

and is shipped knocked down.

The shelving components includes posts, side and back panels, shelves, full and partial dividers, bin fronts, braces, label holders and swinging and sliding doors. Shelves come in 35 different sizes ranging from 24 by 9 inches to 48 by 36 inches. The shelves are of 18-

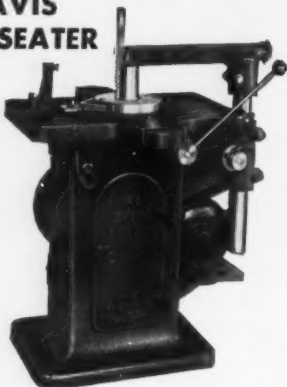


Hallowell Steel Shelving fully assembled and in use

Why Use A Shaper to cut Keyways when a DAVIS KEYSEATER

will
do the
job so
much
quicker
and
better?

•
Send
for
Circular



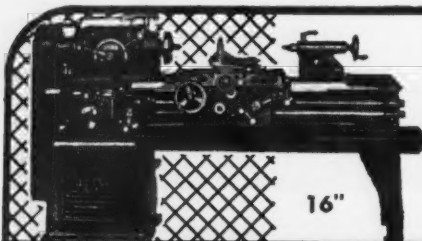
DAVIS KEYSEATER CO.

Exchange and Glasgow Sts.
ROCHESTER, N. Y.

For more data circle 489 on Reader Service Card

gauge steel. Posts, which are available in both 11 and 13 gauge, can be supplied in heights of 3 feet 3 inches to 10 feet 3 inches by 1 foot increments. For heights beyond 10 feet 3 inches, standard post lengths can be spliced. Holes in the posts are on 1-inch centers, thus shelf heights can be varied from 1 inch to as large a height as desired.

Ledge-type units, open and closed, are available for use when greater shelf capacity is required in the lower



CARROLL AND JAMIESON LATHES

• This 16" lathe is equipped with 12 speed geared head, motor drive, and Timken mounted spindle. It's modern in design — with liberal dimensions.

Write today for descriptive bulletin 39-A-10.

THE CARROLL & JAMIESON MACHINE TOOL CO. BATAVIA, OHIO, U.S.A.

For more data circle 490 on Reader Service Card



CENTRIFUGAL COOLANT PUMPS

Circulate and pump coolants where volume
is essential with low head pressure

GET ALL THESE IN EVERY FULFLO



MODEL FVMS
Vertical
MODEL FHMS
Horizontal

- constant pumping action
- chips or grit cannot interfere
- spring tension packing prevents leaks
- no bearing in pump to wear out
- pump shaft replaced easily
- automatic adjustment
- carbon seal, if desired
- splashproof, ball-bearing motors

Belt, motor or direct drives.
Vertical or horizontal
installations.

Capacities: $\frac{1}{4}$ to 1 hp;
pipe sizes $\frac{3}{8}$ " to $1\frac{1}{2}$ ".

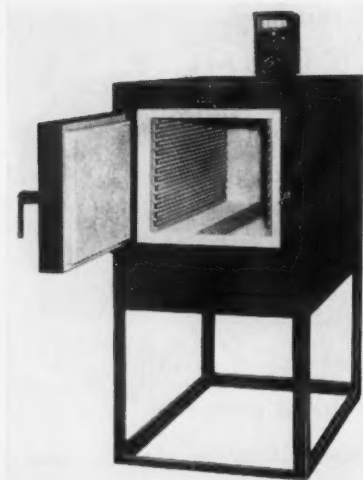
Motor drive:
flanged mount; $\frac{1}{4}$
hp; 30 gal. per
min., spring ten-
sion packing; re-
placement pump
shaft.

**WRITE FOR FULFLO
MECHANICAL DATA BOOK**
on your letterhead. Please
state if for Pumps, for Valves
or for both.



THE FULFLO SPECIALTIES CO. Inc.
PUMP AND VALVE MANUFACTURERS
BLANCHESTER, OHIO

For more data circle 491 on Reader Service Card



More than two thousand satisfied users
WILL TESTIFY YOU

SAVE 3 WAYS WITH A LUCIFER FURNACE

1—Save on First Cost

CHECK THESE PRICES

Furnace Size	2000°	2300°
6x 6x12"	\$500.00	\$600.00
9x 9x18"	750.00	850.00
12x12x24"	1000.00	1100.00
18x18x36"	1500.00	1600.00

Complete with 100% automatic electronic controls.

2—Save on Man Hours

Less operator attention needed—Lucifer controls are EXACT. They reach SPECIFIED heat rapidly and retain SPECIFIED temperature without variation. No special experience required when you use a Lucifer Furnace.

3—Save on Maintenance

Finest refractory materials are built into Lucifer Furnaces for better, more efficient heat retention. Elements are guaranteed, long lived, trouble free.

WRITE FOR FREE LITERATURE, specifications and price list of Lucifer Furnaces in wide range of sizes—top loading and side loading types. Engineering advice without obligation. Write, wire or phone today.

LUCIFER FURNACES, INC.

NESHAMINY 6, PA.
Phone Osborne 5-0411

For more data circle 492 on Reader Service Card

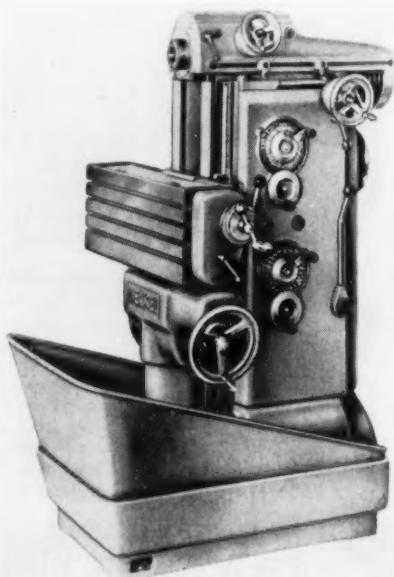
new shop equipment . . .

compartment than above. Counter-height shelving units can be supplied. For more data circle 30 on Reader Service Card

★ ★ ★

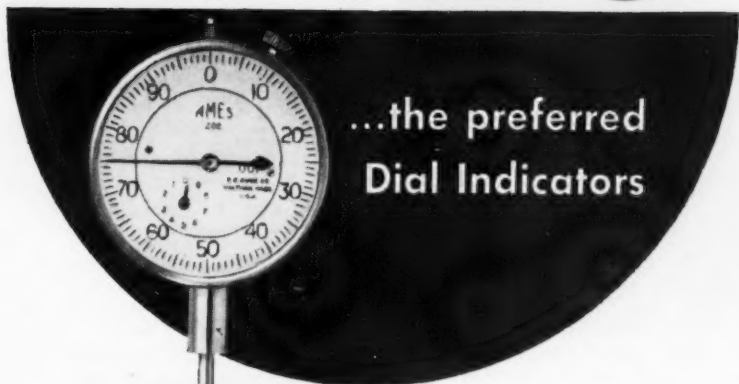
IMPROVED UNIVERSAL MILLER HAS INCREASED WORKPIECE SIZE CAPACITY

Cosa Corp., 405 Lexington Ave., New York 17, N. Y., has announced the Deckel Model FP2 Universal Milling and Boring Machine which is said to be capable of performing accurate drilling, boring, slotting and vertical, horizontal, angular or spiral milling operations. Improvements over the earlier model include increased size of workpiece capacity and increased



Deckel Model FP2 Universal Milling
and Boring Machine

AMES



Over 16,000,000 cycles
without wear or loss of accuracy . . .
how many more will they complete?

Several Ames Model 282 Long Range Dial Indicators *with plain bearings* are currently giving an amazing demonstration of performance and endurance under test conditions. After more than 16,000,000 cycles each, at 240 strokes per minute, 9 hours a day—they still have their original accuracy!

The reasons for this outstanding record? Simply high quality materials, simple basic design, rugged construction . . . and expert craftsmanship.

If you would like to have our recommendations on your measurement problem, send blueprints and specifications. And ask for your free copy of our catalog on Ames micrometer dial indicators and gauges.



Representatives in
principal cities.

B. C. AMES CO.

29 Ames Street
Waltham 54, Mass.

Mfrs. of Micrometer Dial Gauges • Micrometer Dial Indicators

For more data circle 493 on Reader Service Card

new shop equipment . . .

number of speeds and feeds. The major features of the machine include built-in motor; two-directional power feed to spindle head; additional axial adjustment of spindle in head; 18 speeds from 40 to 2,000 r.p.m.; 18 feed rates



**Micro
Supreme**
**LAY-OUT AND
IDENTIFICATION DYE**

7 COLORS

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheets, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

**MICHIGAN CHROME &
CHEMICAL COMPANY**
8615 Grinnell Ave. • Detroit 13, Mich.

For more data circle 494 on Reader Service Card

from 0.315 to 15.8 inches per minute; directional single-lever control of table feed; rapid power traverse in all directions; swivel-type vertical boring and milling head with three feed rates; horizontal and vertical cutter spindles with No. 40 I.S.A. taper; control conveniently grouped within easy reach of the operator; and guide ways and screw spindles protected by bellows.

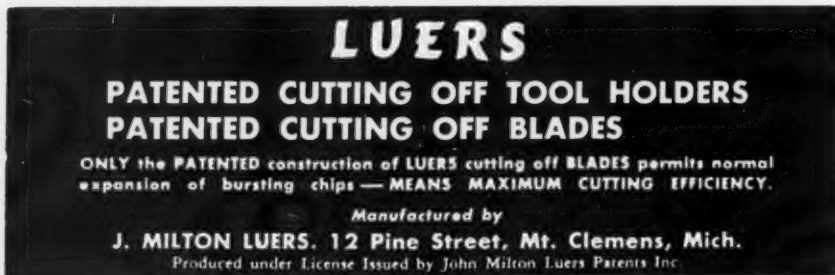
The machine is equipped with a 3-h.p. motor and overarm for extending the horizontal spindle. Special attachments for the machine include vertical spindle head, high speed vertical spindle head, milling and boring head, slotting attachment angular tables, circular table, jig boring table, index head and spiral milling attachment.

For more data circle 31 on Reader Service Card

★ ★ ★

TAPS ARE PACKAGED IN POLYETHELENE PLASTIC CONTAINER

Besly-Welles Corp., 108 Dearborn Ave., Beloit, Wis., has announced that its high speed and carbon steel taps in 0.80 through 5/16-inch sizes are now being packaged in a polyethylene plastic container. The container, which is the same size and shape as the popular "slip-together" cigarette boxes, is said to be much more durable than the cardboard boxes formerly used. It is oil and grease resistant, can be easily



LUERS

**PATENTED CUTTING OFF TOOL HOLDERS
PATENTED CUTTING OFF BLADES**

ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips — MEANS MAXIMUM CUTTING EFFICIENCY.

Manufactured by
J. MILTON LUERS, 12 Pine Street, Mt. Clemens, Mich.
Produced under License Issued by John Milton Luers Patents Inc.

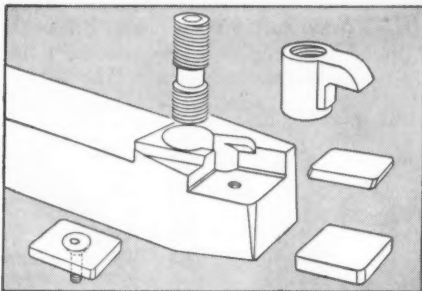
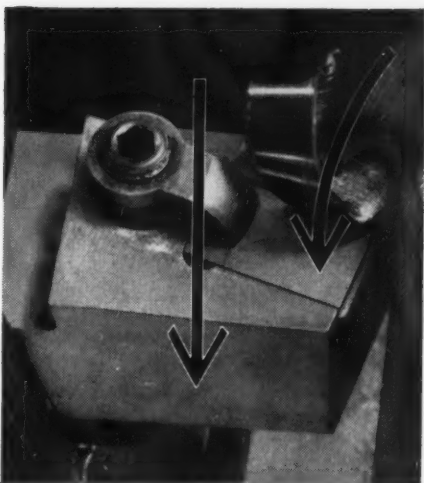
For more data circle 495 on Reader Service Card

NEW KENDEX* TOOLING costs less on all 3 counts

... initial cost, tool cost per piece
and parts replacement cost

Each component of the new Kendex Tooling has been designed with but one thought in mind . . . lowest possible cost per cutting edge.

The holders are of simple but sturdy construction, and have the capacity to take deep cuts in a wide variety of operations. The clamp lifts for quick, accurate indexing, and is so designed that clamp forces are in the same direction as cutting forces—not opposed to them, eliminating counter stresses. Hardened, replaceable shims, on all but the smallest size, protect the shanks against accidents with the tools. There is no complicated seat adjustment mechanism to weaken the Kendex shank. Kendex "turnover" inserts fit perfectly into place in



accurately ground seats, and are supported by solid, heat-treated shanks. Center height of the cutting point is constantly maintained.

The new Kendex is available in a range of sizes in nine styles and two models: the Standard Tool used with or without replaceable chipbreakers, for a wide variety of average operations; the Heavy Duty model, with low cost, replaceable chip deflector, for cutting heavy and irregularly shaped forgings or castings where depth of cut may vary as much as one inch from side to side. Both models use "throw-away" inserts . . . eliminate grinding.

To learn how you, too, can cut machining costs on all three counts, call your Kennametal representative, or write to KENNAMETAL INC., Latrobe, Pennsylvania.

*Registered trademark

The effectiveness of the rugged Kendex holder can be measured by its capacity to take a variety of cuts, from extra light to very deep, using the same tool.

Clamp forces are in same direction as cutting forces—and not opposed to them. This is indicated by the arrows in the above photograph. Counter stresses are thus eliminated, adding to tool life.

← The new Kendex is simple in design with a minimum of parts . . . no complex mechanism to adjust or fail.

"Throwaway" type inserts index quickly and accurately in the rugged, heat-treated shank, with cutting edge perfectly aligned. Clamp has sufficient travel to hold insert when carbide chipbreaker is not used. Shim (where used) screws to holder.

The table below gives a comparison of initial cost of Kendex holder and hardware with a comparative competitive tool. Note the low cost of replacement parts for the Kendex KAR 16.

TOOL COST COMPARISON

(1"x1" shank, without inserts)

Toolholder "A"		Kendex KAR 16	
Holder only	\$25.00	Holder only	\$ 8.00
Hardware:		Hardware:	
Chipbreaker plate	3.50	Shim†90
Elevator	4.25	Clamp	1.25
Main screw	1.00	Clamp screw	0.15
Chipbreaker plate screws	0.35		
Total initial investment	\$34.10	Total initial investment	\$10.30

†Hardened, replaceable shim absorbs stresses of any possible overloading beyond tool capacity. Inserts last longer and machining costs are held to a minimum.

5510



MINING, METAL AND WOODWORKING TOOLS

WEAR AND HEAT-RESISTANT PARTS



INDUSTRY AND
KENNAMETAL
...Partners in Progress



ABRASION, CORROSION-RESISTANT PARTS

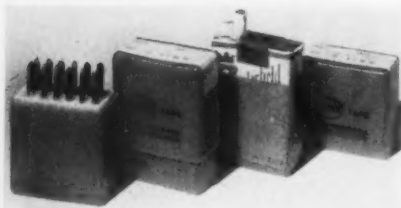
PERCUSSION AND IMPACT PARTS

For more data circle 496 on Reader Service Card

March, 1955

MODERN MACHINE SHOP 287

new shop equipment . . .



Besly Taps packaged in polyethylene plastic containers

cleaned and will not deteriorate with age or use. A filler of plastic "Styrofoam" inside the box holds the taps firmly in position to prevent damage during shipment and storage.

Easy-to-read labels with full description of size, quantities, and so on, on

the top of the container speed identification of the taps inside and simplify stocking. Different colors for the containers identify the various types of taps; namely, orange for high-speed ground thread taps, red for high-speed cut thread taps, and white for carbon steel taps.

For more data circle 32 on Reader Service Card

★ ★ ★

**STANDARD SIZE DRILL BLANKS
ARE AVAILABLE IN
COMPLETE SETS**

The William T. Hutchinson Co., Box 328, Union, N. J., has announced a complete package of high speed steel drill blanks.

The drill blanks range in size from 0.040 to 0.500 inch and are contained in three separate sets, each in an appropriate index case. The sets—

★ ★ ★ ★ ★

CLIPPER

PRECISION DIAMOND TOOLS



CLIPPER'S NEW B-XX RESIN BONDED DIAMOND WHEELS DRASTICALLY REDUCE COSTS. FIELD TESTS PROVE: **25% MORE WEAR—FASTER CUTTING—MAINTAINS SHARP CORNERS.** CLIPPER MANUFACTURES A COMPLETE LINE OF DIAMOND TOOLS AND WHEELS OF GUARANTEED QUALITY. PROMPT DELIVERY. ASK FOR LITERATURE.



JONES & LAMSON
NX-967-1



CLUSTER
WHEEL
DRESSER
CT-7



HOGLUND
FORM
DRESSER



EX-CELLO
48-4103



BORING
TOOL



SINGLE
POINT
DRESSER



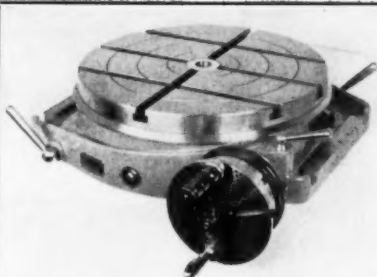
REISHAUER
GRINDER

Representatives in Principal Cities

CLIPPER DIAMOND TOOL CO., INC.
21 C WEST 46 STREET, NEW YORK 36



For more data circle 497 on Reader Service Card



WALTER

PRECISION DIVIDING ROTARY TABLES

With & Without Dividing Discs

- READABILITY: 6 SECONDS.
- CONSTRUCTED FOR LONG LIFE.
- MAINTAIN PRECISION.
- AVAILABLE IN 10", 12 1/2", 15 3/4", 19 3/4".

Also many types of **Universal Precision Dividing Heads and Attachments** for most economical production.

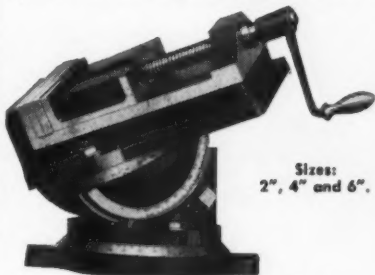
Test reports furnished with literature.

Sole Agents:

KARL A. NEISE 404 4TH AVE., Dept. MMS
NEW YORK 16, N. Y.

For more data circle 498 on Reader Service Card

TOOLMAKERS!



Sizes:
2", 4" and 6".

NOW SET-UP FASTER--

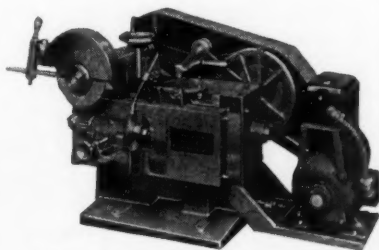
Save time on intricate, angular set-ups with the fully universal **MASTER MULTI-SWIVEL VISE**. Three swivels instantly set any compound angle. Used worldwide. Interchangeable platens optional.

Write for Circular

DONOVAN MFG. CO.
80 BATTERYMARCH ST., BOSTON 10, MASS.

For more data circle 499 on Reader Service Card

Are You Cost Minded?



WARDWELL

Manufacturing Co.

3803 Ridge Rd.
Cleveland 9, Ohio

Maker of largest line of saw and tool sharpening machines

Then figure the *enormous savings* in saw sharpening costs and saw purchases, when a group of 40 to 150 saws can be ground at one time—with the **WARDWELL Model 35T**.

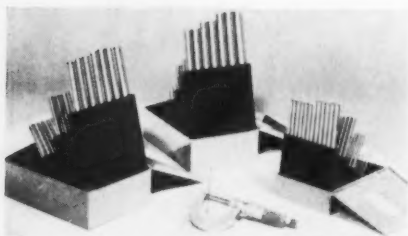
This recent development sharpens milling, slitting and screw-slotting saws in gangs, in one setting . . . all size saws 2" to 5 1/2".

Completely automatic. Just start machine—it does the rest.

Reduce maintenance costs now with the **WARDWELL 35T**. Write for free bulletin No. 35T today.

For more data circle 500 on Reader Service Card

new shop equipment . . .



Hutchinson Standard Size Drill Blank Sets

the jobber set, the letter size set and the wire size set—number 115 pieces in all and are high speed steel, hardened to 64 "C" scale. Each individual blank is ground to gage tolerance and mirror finish. The manufacturer suggests that the separate blanks may be used for punches, ejector or insert pins

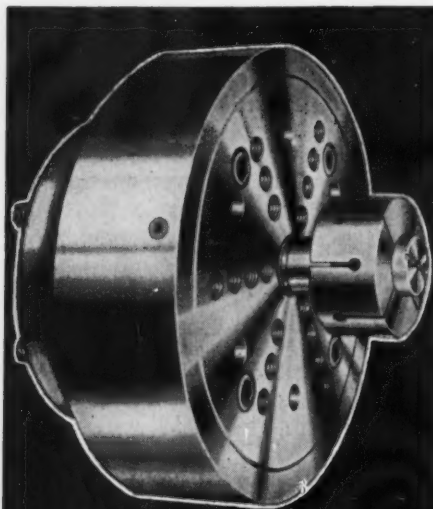
and for the manufacture of special tools, as the individual pins may be easily replaced.

For more data circle 33 on Reader Service Card

★ ★ ★

INTERNAL MICROMETER ACCURATELY DETERMINES BORE DIAMETERS

Engis Equipment Co., 431 S. Dearborn St., Chicago 5, Ill., has announced the "Matrix" Micro-Maag Internal Micrometer which is designed to accurately determine bore diameters from $\frac{1}{4}$ to 8 inches. The instrument incorporates irregularly spaced gaging pins which are claimed to detect most forms of out-of-roundness. The pins are lapped to fit tightly, and there is no open keyway in the head which would permit dirt to enter, making the instrument ideal for grinding operations. Ac-



9 Reasons for You to get the Facts on SPEEDGRIP CHUCKS

1. They increase production.
2. They give greater accuracy.
3. Set-up time is shorter.
4. They are safer to operate.
5. First cost is low.
6. Maintenance cost is low.
7. Design is simple.
8. Guaranteed to do the job.
9. Service is prompt.

Speedgrip Precision
Internal Chucks will save
you money on second
operation work.

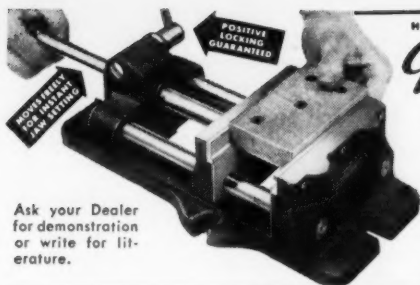
WRITE FOR FREE MANUAL



SPEEDGRIP CHUCK

820 N. WARD STREET
ELKHART, INDIANA

For more data circle 501 on Reader Service Card



Ask your Dealer for demonstration or write for literature.

HEINRICH
Grip-Master
SCREWLESS VISE

GRIPS WITH SPEED CUTS TOOLING COSTS

Step up drill press production with the Heinrich "Grip-Master" Screwless Vise—with the patented "Circle Grip" hammer blows cannot break. Work is automatically leveled; jaws set instantly, effortlessly. 3", 4", 6", 8" jaw widths; ideal as base structure for drill jigs and fixtures.

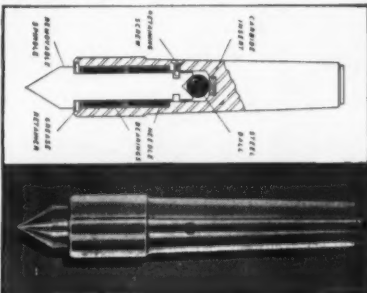
HEINRICH TOOLS, INC.
DEPT. 115-C • RACINE, WISCONSIN

For more data circle 502 on Reader Service Card

Turning accuracy to .00015 WEE LIVE CENTERS

Prove to your satisfaction that Wee Live Centers afford faster, chatter-free, accurate performance in lathes, grinders, hobbers. Test one, learn why leading companies order and re-order. No. 2, M. T., \$21.00; No. 3, \$24.00. Your money-back if center does not prove its worth in 24 day-trial. Request complete price list, many sizes, tapers, shanks. Write direct, if distributor cannot supply you.

HERBERT CROSS & SON, Bala-Cynwyd 1, Pa.



For more data check 503 on Reader Service Card

ACE SPECIALIZED DRILL BUSHINGS for specialized jobs!

presents
4 New Standard Bushings,
available in a wide range of
dimensions for immediate,
overnight delivery.



HEX-LOK®



SERRA-LOK®



DIAMOND-LOK®



SERRATED

For embedment in soft, castable and non-ferrous materials

For pressing into soft materials

ASK FOR CATALOG E.



ACE... first to offer a Complete Line of over 22,000 A. S. A. and ACE standard sizes, types and specifications in Drill Bushings, now presents

FOUR NEW MEMBERS

The exclusive 'grooved' design provides a torque-resisting withdrawal-defying 'locked-in-the-jig-plate' connection which, under normal use, will not pull or twist out.

*PAT. PENDING



ACE DRILL BUSHING CO., INC.
5407 Fountain Ave., Los Angeles 29, Calif.

Write for Free Catalog, Price Lists, Quantity Discount Schedules and Technical Data

For more data check 504 on Reader Service Card

new shop equipment . . .

cording to the manufacturer, the unit requires practically no individual skill or "feel," as the thimble which actuates the taper needle is controlled by a spring which ensures repetition of measurement. The 10-to-1 needle taper is said to cause the micrometer thread



"Matrix" Micro-Maag Internal Micrometer

to operate with 10 times its normal accuracy.

The measuring heads of the micrometer are fully interchangeable within the various sets, thus providing complete flexibility without sacrifice of accuracy. The graduations on the thimble read directly to 0.00005 inch in the small sets, and 0.0001 or 0.0002 inch in the larger sets.

For more data circle 34 on Reader Service Card

★ ★ ★

PRECISION LATHE IS EQUIPPED WITH BALL BEARING HEADSTOCK

Identified as the Model 750, a precision watchmaker and instrument lathe which is equipped with a ball bearing headstock having a runout $\frac{1}{2}$ inch from the headstock of less than 0.0001 inch has been introduced by F. W. Derbyshire Inc., 157 High St., Waltham, Massachusetts.

The lathe features lever collet closer; V-belt drive; six position turret; double compound slide rest with

Does jobs no drill can do! up to
10 Times Faster than Boring!

NEW Clark "HOLE-MAKER"



Totally new—maximum rigidity, no chatter! Roughs or finishes holes to exact size in FORGINGS, CASTINGS, BOILER PLATE, THIN STOCK, TUBING; CROWNED, CYLINDRICAL AND FLAT SURFACES. One of 3 blades is always in the cut on odd work shapes—smooth action even on intermittent cuts! Use new HOLE-MAKERS in radial drills, drill presses, turret lathes, portable electric or pneumatic drills, etc. Excellent for trepanning and rough boring I.D.'s in Tubing, Castings, etc...a real production tool!

Holes can't drift, spindle can't deflect—it's piloted 2 ways!

Cuts steels, plastics, transite, non ferrous metals, stainless steel, etc!

5 ADJUSTABLE SIZES: Specify Straight Shank or M.T. 2, 3, 4. Other tapers on order

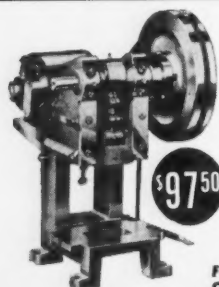
Models:	102	203	304	405	506
Capacity:	1" to 2"	2" to 3"	3" to 4"	4" to 5"	5" to 6"

Order from your dealer or write for catalog!

ROBERT H. CLARK COMPANY

9330 Santa Monica Blvd., Beverly Hills, Calif.

For more data check 505 on Reader Service Card



\$97.50

less
Motor

Free
Circular

CUT COSTS with ALLEN Punch Press

2-Ton Power Bench Type . . Powerful, Dependable, Economical

For light work—stamping, forming, riveting—metal, fiber or other material.

Overall height 19 $\frac{1}{2}$ " . . . Base size 9" x 8 $\frac{1}{4}$ " . . . Die bed 6 $\frac{1}{4}$ " x 8" . . . Ram face 1 $\frac{1}{2}$ " x 3 $\frac{1}{2}$ " . . . Ram stroke $\frac{3}{4}$ " . . . positive $\frac{3}{4}$ " ram adjustment . . . sturdy, single pin, non-repeat hand lever clutch . . . V-belt drive . . . weight 105 lbs.

The machine of a thousand uses! Adequate for many types of work now done on large presses at greater expense. Requires only $\frac{1}{2}$ HP motor.

30-DAY MONEY-BACK GUARANTEE. Order TODAY. Price \$97.50 F.O.B., Clinton, Mo. (Includes Motor bracket, V-belt, motor pulley.)

Dealer Inquiry Invited

ALVA F. ALLEN, Dept. MM, CLINTON, MO.

For more data check 506 on Reader Service Card

NUMBERALL

Model
No. 50

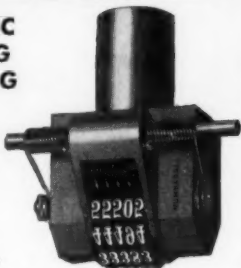
AUTOMATIC INDENTING NUMBERING HEAD

Automatic
indenting
numbering
head for
consecutive
or repeat
numbering. $\frac{1}{32}$ "

up to $\frac{3}{8}$ " high figures can be furnished in sharp face Gothic or shaded Roman figures. Can be used in foot or power presses. Numbers: radio, airplane, tool parts, name plates, and other objects in brass, steel, fiber, plastics. Heads are of sturdy construction and give uninterrupted marking service. Catalog MS-50 on request.

Prompt delivery of most sizes.

NUMBERALL STAMP & TOOL CO.
HUGUENOT PARK STATEN ISLAND 12, N. Y.



See DoALL'S New PRODUCTO-CHEK Mechanical Comparator

- Low Cost
- Extreme Accuracy
- Speeds Inspection
- Direct Reading
- Reduces Error
- No gears, lever, racks.

For a demonstration, see yellow directory for DoALL Sales Service Store that stocks complete line of gaging specialties.

Call or Write
The DoALL Co.
Des Plaines, Ill. No. 9



.0001", .00005"
and .000010"
gaging heads.

For more data circle 507 on Reader Service Card

For more data circle 508 on Reader Service Card



"Stack Up"



Sterling Bin Front "Top Rim"
Steel Stacking Box.
Size: 18" x 12" x 6".

THESE BOXES AGAINST ANY!

Once you use and compare Sterling stacking boxes, you'll know why we invite comparison in design, construction, and price. Our "Top Rim" construction provides stronger support all around the box . . . no corner inserts to become loose and fall out. Efficiency in designing and manufacturing allows us to quote favorably on any type or size stacking box.

Write for literature and prices.

Sterling Factory Equipment Co., 183 Charles St., Providence, R. I.



Sterling "Top Rim" Steel Stacking
Box with drop handles.
Size: 18" x 12" x 6".



Sterling

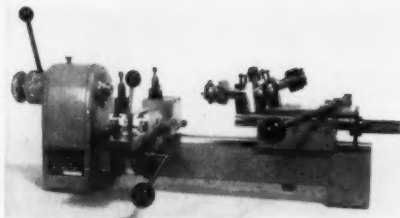
Quality Handling & Storage Equipment



For more data circle 509 on Reader Service Card

new shop equipment . . .

rack and pinion cross slide; and a front tool post which swings 360 degrees. The machine has an overall length of 24 inches and a length over the bed of 22 inches. The swing over the bed is 2.953 inches. With a variable speed drive, spindle speeds range from 590 to 4,700



Derbyshire Model 750 Watchmaker and Instrument Lathe

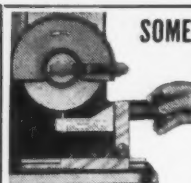
r.p.m. with a one-to-one pulley ratio and from 1,180 to 9,400 r.p.m. with a two-to-one pulley ratio.

For more data circle 35 on Reader Service Card

★ ★ ★

DOUBLE-ACTION CLAMP IS DESIGNED FOR WELDING

Specially designed for the welding industry, a double-action welder's clamp which is said to facilitate the clamping of workpieces where the clamping surfaces are obstructed by overhanging portions, such as on I-bars, T-bars and various other angular sections or undercuts, has been introduced by Wetzler Clamp Co., 43-15 11th St., Long Island City 1, N. Y. Both jaws slide freely on the high carbon steel bar and are provided with full length spindles permitting a 3½-inch thrust, thus eliminating the necessity of using shims or other filling mate-



SOMERSET Radius Dresser SAVES TIME

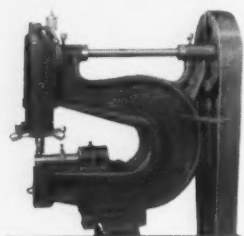
Thousands of Somerset Dressers in service. Offer outstanding features — Wheel is dressed from below, avoids removal of guard. Stop pins permit rotation thru 180° or 90° either direction. Wear-resistant bearing is dustproof.

Write for illustrated folder. Immediate Delivery.

SOMERSET TOOL CO. 320 Virginia St. Hillside, N. J.

For more data circle 510 on Reader Service Card

SAVAGE NIBBLING MACHINES



NOW TUBE CUTTING ATTACHMENTS for ANY SIZE SAVAGE NIBBLING MACHINE

For slotting, cutting off and forming special ends. Cutting by guide lines or template.

Capacity in tube wall thickness to one half rated capacity of Nibbler. Tube sizes from 1" I.D. to 3½" O.D. Larger diameters for lighter gauges.

Quotation on Request

"NIBBLE YOUR COSTS"

W. J. SAVAGE COMPANY
Knoxville Since 1885 Tennessee

PIONEER MFRS. OF NIBBLING MACHINES

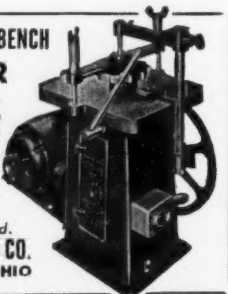
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READING BENCH KEYSEATER

Portable—move directly to job; a time saver for both small and large shops.

3¼" stroke; adaptable for other work. Low first cost — prompt delivery.

Good dealers wanted.
READING MACHINE CO.
CINCINNATI 37, OHIO



For more data circle 512 on Reader Service Card

HOWALD CARBIDE MILLING CUTTERS



PATENTED
END MILL

- SQUARE BLADES Easily Replaced.
- Simple, Accurate Blade Adjustment.
- Lowest Blade Cost.
- Cutters from 1½" to 14" dia.



PAT.
SHELL
MILL

SEND FOR BULLETIN

W. T. HOWALD
MACHINE WORKS

182 SIGOURNEY ST., BROOKLYN 31, N. Y.

For more data circle 513 on Reader Service Card

CHECK YOUR "MIKES"

this fast, accurate way

New DoALL Set
checks readings
and spindle
surfaces

- Three Gage Blocks
- Two Optical Flats
- Accessories
- Millionths Accuracy



Call
DoALL

see classified phone
directory for nearest
DoALL Service Store —
complete stock of gages,
cutting tools, supplies.

Or Write

The DoALL Co.

Des Plaines, Ill.

24



For more data circle 514 on Reader Service Card



24-HR. SERVICE on *Special* CARBIDE TOOLS

Yes, 24-hour service on:

- ★ Modifying standard tools right out of stock to your specifications.
- ★ Re-working draw dies and punches.
- ★ Tube mill scarfing tools.

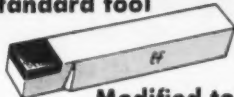
**Two and three-day service on
NEW flat and circular form tools**

Please send inquiries to (Car-Mac Division)

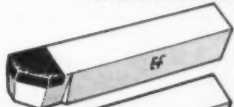
CAREY-McFALL CO.

2156 E. Dauphin Street • Phila. 25, Pa.

Standard tool



Modified to:



For more data circle 515 on Reader Service Card

new shop equipment . . .

rials. According to the manufacturer, the welding torch has access to any portion of the workpiece, as the clamp may be moved out of the way readily by simply rotating it about its spindle axis. For this purpose, the pressure

CAMS

Fully equipped modern machine shop with extensive Jig Boring, Surface Grinding, Horizontal Boring and Thread Grinding facilities as well as modern Cam Milling and Cam Grinding equipment.

Your Inquiries Answered Promptly

HIMOFF MACHINE CO., INC.

23-16 44th Road Long Island City 1, N. Y.

For more data circle 516 on Reader Service Card

RAYMAC *Solid Carbide* DRILLS and REAMERS

Raymac drills cut hardened metal . . . do not burn or anneal. Feature operational speeds of 350 to 600 RPMs depending on size and hardness of metal.

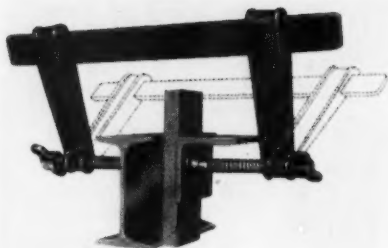
Raymac solid carbide reamers are custom designed for individual jobs.

Write for catalog No. 12

RAYMAC
MANUFACTURING COMPANY INC.
3729 CASS AVENUE, DETROIT 1, MICH.

For more data circle 517 on Reader Service Card

296 MODERN MACHINE SHOP



Wetzler Double-Action Welder's Clamp in use

plates of the spindle turn but do not swivel. The jaws are cast of malleable iron, and the spindles have deep cut Acme threads and are copper plated.

The clamp is available in throat depths of 4, 5 and 7 inches, the throat depth being the distance between the inner bar edge and the spindle center. The corresponding bar widths by bar thicknesses are 1¼ by 5/16, 1½ by ¾ and 1½ by ¾ inches, respectively. The maximum distances between jaws range from 8 to 36 inches.

For more data circle 36 on Reader Service Card

★ ★ ★

SIX CHUCKS ADDED TO SUPREME LINE

Supreme Products, Inc., 2222 S. Calumet Ave., Chicago 16, Ill., has added six chucks to its line, bringing the total

CUT TOOL COSTS

Twisted or broken taps replaced at low costs on any tool with a Morse Taper (sizes 1 to 4). Hundreds of leading industries save money on drills, reamers, countersinks, cutters, drivers, the NU-TANG way. Prompt delivery. Send for prices—or send tools for repair. All work guaranteed.

NO WELDING! NO SLEEVES! NO SHORTENING! NO DISTORTION!

GUARANTEED STRONG AS NEW!

Send them to us like this!

broken tools made like new again with NU-TANGS

WE return them like this!

Patent No. 2,312,013

NU-TANGS

INC. 1339 Bates Avenue
Cincinnati 25, Ohio

For more data circle 518 on Reader Service Card

March, 1955

Best Check for
Parallelism ...
Squareness ...
Angles ...

Perkin-Elmer's Optical

ANGLE COMPARATOR



Simplifies and speeds inspection of parts, even those difficult to approach. • Measurements read directly from graduated reticle. • Operates entirely on optical principles—no physical contact with part required—precision is independent of the operator.

For descriptive booklet write:

The Perkin-Elmer Corporation, 885 Main Avenue, Norwalk, Conn.

PERKIN-ELMER

Optical Tooling for the Modernized Machine Shop

For more data circle 519 on Reader Service Card

NEW DoALL *Demon* High Speed Steel SAW BANDS

- Up to 10 times faster cutting!
- Up to 30 times longer life!
- Full safety blade



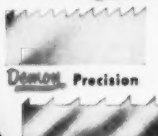
Call
DoALL

—see directory for nearest DoALL Service-Store that stocks cutting tools, gages, supplies.

or Write

The DoALL Co.

Des Plaines, Ill.



Demon Buttress

1/4" to 1"
2 to 10 pitch

For more data circle 520 on Reader Service Card

Free WRITE TODAY FOR Continental CATALOGS

CUT-OFF MACHINES—faster, cleaner, low cost cuts of pipes and tubes up to 12 3/4" O.D. Air or hand-operated models.

CUT-OFF WHEELS — more cuts between sharpening. Made for all makes of rotary cut-off machines.

GRINDING MACHINES—for cut-off wheels and chasers. Grind your own—avoid delays in production—keep sharpening costs down.



Continental MACHINE CO.

SINCE 1919

1952 N. MAUD AVE. • CHICAGO 14, ILL.

For more data circle 521 on Reader Service Card

new shop equipment . . .

number to 34 models which are available for industrial users. Model numbers and capacities of the newly added chucks are the Model 15T33 with a capacity from 0 to $\frac{1}{2}$ inch; the Model 15T33-C with a capacity from 0 to $\frac{1}{2}$ inch; the Model 8T3 with a capacity from $\frac{1}{8}$ to $\frac{5}{8}$ inch; the Model 8F with a capacity from $\frac{1}{2}$ to $\frac{5}{8}$ inch; the Mod-

el 9T3 with a capacity from $\frac{3}{16}$ to $\frac{3}{4}$ inch; and the Model 9F with a capacity from $\frac{3}{16}$ to $\frac{3}{4}$ inch.

For more data circle 37 on Reader Service Card

★ ★ ★

TAPPING ATTACHMENT ELIMINATES LEAD ERROR

Tapmatic Corp., 845 W. 16th St., Costa Mesa, Calif., has announced the

"300" Tapping Attachment which is claimed to eliminate human variable "lead error." Said to operate on the "weightless tapping" principle, the attachment does not require any spindle pressure by the machine operator during the tapping operation. According to the manufacturer, axial floating action assures consistently uniform tap-

FREE MANUAL

tells why
**DY-NAMIC
BALANCING**
should be a regular
part of EVERY
**MAINTENANCE
OPERATION**

This newest-edition Dy-Namic Balancing Manual contains information on latest technological advancements to improve maintenance work.

Shows how to improve performance of overhauled or repaired machinery and parts, by eliminating mechanical failures and assuring greater efficiency.

Explains how Dy-Namic Balancing keeps equipment operating without interruption. See how periodic checking and Dy-Namic Balancing of rotating parts will reduce bearing wear and noise, as well as eliminate costly downtime for repairs.

For your free copy, write: Bear Mfg. Co., Dept. M-25, Rock Island, Illinois.

24 PAGES OF VALUABLE INFORMATION LIKE THIS:

- How To Balance Parts From 4 Oz. to 8 Tons!
- What is Dy-Namic Un-balance?
- The Difference Between Static and Dy-Namic Un-balance!
- How To Balance Rotating Parts Statically and Dy-Namically In One Operation!
- How Other Plants Are Using Dy-Namic Balancing To Save Time and Money!
- How Dy-Namic Balancing Improves Product Performance!
- How Dy-Namic Balancing Reduces Wear, Eliminates Noise And Vibration.
- Details, Specifications And Engineering Data About Complete Line of "Bear" Industrial Dy-Namic Balancing Machines.



782M



For more data circle 522 on Reader Service Card



Tapmatic "300"
Tapping Attachment

SAVE \$10,000.00
in perishable tool
inventory with
HAYDEN ADJUSTABLE DRILLS



Two Hayden Adjustable Drills will do the work of \$10,000.00 worth of tools. These drills come in two sizes, 1" to 2"; 2" to 4". Cutting blades of H.S. steel. Carbide tipped blades extra. Write for literature.

HAYDEN TWIST DRILL CO.

8622 Lyndon Ave., Detroit 38, Mich.

For more data circle 523 on Reader Service Card

**DoALL Granite
SURFACE PLATES**

Non-Rusting • Non-Magnetic • Utmost
Accuracy • Cheaper Than Metal Plates

- Wear Free
- Shock Proof
- Harder than hardened steel
- Velvet Smooth
- Unsurpassed for Production, Inspection and Layout Work



Consult your yellow Directory for location of nearest of the thirty-eight DoALL Sales-Service Stores that stock complete metal working necessities.

Call or Write
The DoALL Co.
Des Plaines, Ill.

INDIVIDUAL
Working Flats
only \$22.50 Ea.
DoALL
2" x 8" x 12"
.0002" Surface Accuracy

For more data circle 524 on Reader Service Card

People work better when they SEE BETTER



AT IBM
IBM model shop
worker using
MAGNI-FOCUSER
on a filing operation for a business machine part at the company's Endicott, N. Y. plant.

MAGNI-FOCUSER

SPEEDS PRODUCTION
With Third Dimensional (3-D) Vision
Leaves both hands free to work

Magni-Focuser—the binocular magnifier—reduces eye-strain and prevents squinting—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

Send for descriptive folder

MAGNI-FOCUSER's
matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

EDROY PRODUCTS CO.

480 Lexington Ave.,
Dept. P, New York 17, N. Y.

new shop equipment . . .

ped holes, and the dimensions and forms of the thread produced are solely dependent on the tap itself. Tap breakage and work spoilage are said to be minimized by the positive torque control of a spring-loaded ball clutch. The function of this clutch, it is claimed, is not affected by r.p.m. variations, oil or



**DRILL and
PILOT
BUSHINGS**
*Frictionless
—Rotary*

For core drilling, T. C. and high speed boring, turret tool, piloting, etc. Won't stick or clog. Dust proof as a watch. Write for details.

GATCO ROTARY BUSHING CO.
42330 Ann Arbor Road, Plymouth, Michigan

For more data circle 526 on Reader Service Card



**TAPERED SHANK
KEYSEAT
CUTTERS**

**THE
BEST COSTS
YOU NO MORE!**

CONSIDER THESE ADVANTAGES—

1. Tapered drive assures concentric operation.
2. Special Surface Treatment for longer life.
3. Premium Grade H.S.S.
4. Large Centers for outboard support.
5. **COSTS NO MORE THAN REGULAR WOODRUFF CUTTERS.**

Write for prices and literature—
jobber and agent inquiries welcome

QUALITY TOOL WORKS
792 S. Market Waukegan, Ill.

For more data circle 527 on Reader Service Card

heat, and it will stop the tap instantly when the tap is dull, becomes loaded or bottoms in blind hole tapping.

The tapping attachment has only a 1 3/4-inch maximum diameter and a 3 3/4-inch overall length. It incorporates a reversing mechanism which is said to permit instantaneous reversal of the tap at any time. This is made possible through the use of angular contact ball bearings, with the balls serving the same function as a planetary gear. The attachment also utilizes a Jacobs Rubber-Flex tap chuck. The Tapmatic "300" has a rated capacity for tapping in steel from No. 0 to No. 6.

For more data circle 38 on Reader Service Card

★ ★ ★

NON-ROTATING DRILL STOP AFFORDS PRECISION HOLE DEPTH CONTROL

A non-rotating drill stop which is designed to afford precision hole depth control has been announced by Wohl-nip Products, Inc., 634 Central Ave., E. Orange, N. J. The stop, it is claimed, will not mar, mark or damage the face of the workpiece, fixture or bushing. According to the manufacturer, the drill stop is completely automatic and reduces human errors, simplifies difficult jobs, increases production and accuracy and eliminates rejects. The device can be used for drilling, center

CROSSLEY
"Shur-Grip"
Drill Vise

For fast, accurate
drilling, reaming,
tapping.

Built-in parallels. Hand-
dle swivels. V grooves hold rounds up to 2". Both
vertical and horizontal. 3-way vise holds square,
rectangular and round parts.

Write for illustrated circular.

CROSSLEY MACHINE & TOOL CO., INC.
185 YORK AVE. PAWTUCKET, R. I.



For more data circle 528 on Reader Service Card



BAND-SAW MACHINE ACCESSORIES

used as standard equipment by
leading band-saw manufacturers...

- **CARTER RIGID
BAND-SAW WHEELS**
- **JIFFY TIRES**
- **MICRO-GUIDES**
- **GUIDE-LINE LIGHTS**

cut costs way down,
improve quality

CARTER PRODUCTS CO., INC.

426 Wm. Alden Smith Bldg.
30 Ionia Ave., S.W.

GRAND RAPIDS 2, MICHIGAN

For more data circle 529 on Reader Service Card



Call DoALL
for all types of

MICROMETERS

(Tumico)

Blade Type



Triflumic

Hole Locator



Rolling Mill Mikes
Spar Mikes
Mike Sets
Over-the-Bar Mikes
Inside Mikes, etc.

Die Maker Squares
Snap Gages
Dividers
Calipers
Magnetic Bases

Call DoALL—consult
classified phone directory
for nearest
DoALL Service Store—
or Write:

The DoALL COMPANY

Des Plaines, Illinois 41

For more data circle 530 on Reader Service Card

CUT... operating — maintenance — spoilage **COSTS!**

ON YOUR TAPPING JOBS!

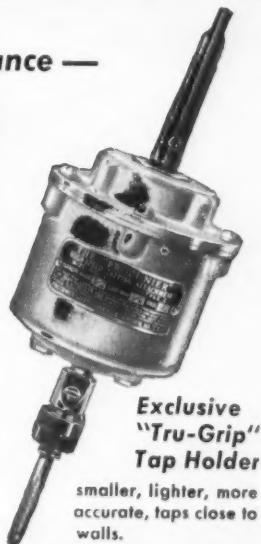
Proconier tappers are the solution to steadily rising production costs on many tapping operations. They have the unique construction features that permit inexperienced operators to tap like experts. In addition, they provide many extra hours of continuous, accurate tapping without frequent "down-time" interruptions, producing more pieces with fewer rejections, less spoilage and a minimum of broken taps.

Check these advantages: New sensitive double cone friction clutch; soft cushioned action driving pressure; ball bearing equipped; heat treated gears; special balanced gear reversing mechanism, plus many others.

Write for free brochure giving full details on the complete line of Proconier Tapping Heads.

PROCUNIER Safety Chuck Co., 12 South Clinton Street,
Dept. 3, Chicago 6, Ill.

For more data circle 531 on Reader Service Card



**Exclusive
"Tru-Grip"
Tap Holder**

smaller, lighter, more
accurate, taps close to
walls.

March, 1955

MODERN MACHINE SHOP 301

RUST-LICK IN AQUEOUS SYSTEMS

RUST-LICK "B"

For use wherever water comes in contact with Ferrous Metal.

STOPS RUST IN

Hydrostatic-Pressure Testing
Cleaning and Washing
Heat-Treating
Grinding Operations
Additive to Soluble Oils

ELIMINATES:

Fire Hazards • Toxicity
Dermatitis • Degreasing

Write for free sample and brochure.

PRODUCTION SPECIALTIES, INC.

755 BOYLSTON STREET
BOSTON 16, MASS.

For more data circle 532 on Reader Service Card



**MADE TO
BLUE PRINT**

Dowel — Straight
Countersunk — Taper
± .0001" Accuracy
.030" to .125" Diam.
Up to 2" Length

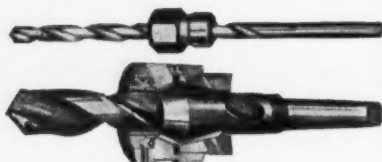
Precision Centerless Grinding Since 1931
Inquiry Invited on Your Volume Requirements

**COMMERCIAL
CENTERLESS
GRINDING CO.**

6605 CEDAR AVE. Phone EN 1-3412 CLEVELAND 3, O.

For more data circle 533 on Reader Service Card

new shop equipment . . .



Wohlnip Non-Rotating Drill Stops

drilling, countersinking, boring, milling, routing and reaming operations on drill presses, radial drills, milling machines, lathes, turret lathes and hand and automatic screw machines. The drill stop is available with standard straight or taper shanks for any size desired.

For more data circle 39 on Reader Service Card

★ ★ ★

TAP EXTENSIONS PERMIT TAPPING IN LIMITED SPACES

The Walton Co., Box 5, Elmwood Branch, Hartford 10, Conn., has announced a line of tap extensions which permits tapping in places where it is difficult or impossible, because of limited space, to turn a tap wrench without lengthening the tap. The extensions are packaged as a set containing two 5-



Walton Tap Extension Set for Tapping in Limited Spaces

SHARP

NAMEPLATE MARKING

Model No. 4



The nameplate on your product is your signature. Keep it neat and legible! Accurate location and alignment are assured with this

NAMEPLATE DETAIL PRESS.

- Simple Operation
- Perfect Alignment
- Uniform Depth

GEO. T. SCHMIDT, INC.



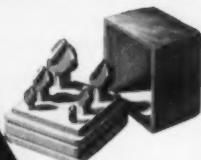
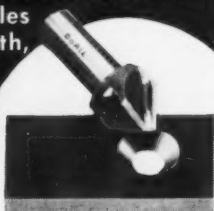
1806 W. BELLE PLAINE AVE.
CHICAGO • 13 • ILLINOIS

For more data circle 534 on Reader Service Card

DoALL CHATTER FREE COUNTERSINKS

...produce holes with a smooth, valve-seat appearance

New off-center flute design. Shears metal — does not gouge. Provides faster, more accurate cutting. Lasts longer. Available in H. S. Steel.



Call DoALL

see classified phone directory for nearest DoALL Service-Store — complete stock of gages, cutting tools, supplies.

Or Write:

The DoALL Co.
Des Plaines, Ill.

Sets available in 60°, 82°, 90°, 100°, 120°, angles

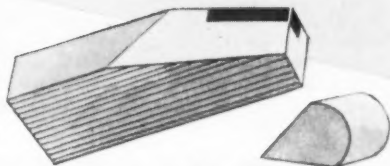
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For more data circle 535 on Reader Service Card

WILLEY'S TUNGSTEN CARBIDE TOOLS

Special tools are our specialty. Send specifications or prints for prompt quotations and delivery dates. Standard tools carried in stock for immediate shipment.

EVERYTHING
from
SOUP TO NUTS
in Tungsten Carbide



WRITE FOR CATALOG

WILLEY'S CARBIDE TOOL CO.

1342 WEST VERNOR HIGHWAY, DETROIT 1, MICH.

For more data circle 536 on Reader Service Card

new shop equipment . . .

inch extensions which can be used singly or in combination. They are made of special alloy steel with square openings, heat treated and cold drawn to conform to size standards of leading tap manufacturers. The extensions are made in a range of sizes to fit all standard taps from No. 10-3/16 to 1 inch. Where some makes of taps have shanks

with squares slightly larger than the standard, the taps should be ground to fit the square sockets of the extensions. For more data circle 40 on Reader Service Card

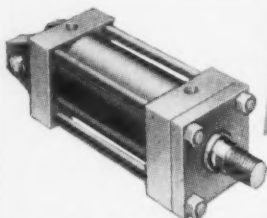
★ ★ ★

HAND NUMBERING DEVICE

Identified as the "Stampmaster," a hand numbering device designed for random or selective numbering on all types of products where a permanent, legible impression is to be applied by hand

has been announced by The Noble & Westbrook Mfg. Co., 25 Westbrook St., East Hartford 8, Conn. Part numbers, heat code numbers and similar identifying data can be set up quickly and easily by indexing individual

EVERY ENGINEER will want a copy of this BULLETIN



WRITE FOR BULLETIN 113. Complete details and mounting dimensions on Hannifin Series "H" Square Type Hydraulic Cylinders—2,000 p.s.i. (3,000 p.s.i., non-shock) maximum pressure. This is the cylinder with the new, externally removable cartridge gland...the biggest improvement in cylinder design in the last 50 years. A complete line! 9 bore sizes from 1½" to 8"...13 standard mountings, many combinations. Steel heads. Steel cylinder bodies, "TRU-BORED" and honed. Piston rods ground, polished and hard chrome plated. Send for Bulletin 113. It's an easy, convenient catalog for use in layout work.

HANNIFIN

Hannifin Corporation, 565 South Wolf Road, Des Plaines, Ill.
Air and Hydraulic Cylinders • Presses • Air Control Valves

For more data circle 537 on Reader Service Card



Noblewest "Stampmaster" Hand Numbering Device

MICRO-HEIGHT GAUGE

BY FAIRFIELD GAUGE CO.



**NO OTHER GAUGE
COMPARES FOR
FAST, ACCURATE
LAYOUT AND
MEASURING**

Capacities to
6" when used
with this
Fairfield Gauge
3" Riser

The Micro-Height Gauge is a precision instrument, finished in satin chrome, which reads like a micrometer and measures from zero at base to 3" in thousandths. Use as a scribe for fast layout, or insert dial indicator for quick, accurate inspection.

Exclusive distributor for U.S. and Canada:

CLEVELAND INSTRUMENT CO.

735 Carnegie Ave., Cleveland, O.

For more data circle 538 on Reader Service Card



**Guaranteed to last longer
than an ordinary drill!**



See your classified phone directory for nearest DoALL Sales-Service Store stocking cutting tools, gages, supplies

- Lower tool cost
 - Less downtime
 - Lower labor cost
 - All sizes in stock
- Try just one for comparison

The DoALL Company
Des Plaines, Illinois

or Write

For more data circle 539 on Reader Service Card



RUEMELIN FUME COLLECTORS KEEP SHOP CLEAR OF WELDING FUMES

This well ventilated welding department is typical of hundreds of similar installations. Welding operators appreciate smoke and gas-free atmosphere. Thousands in service. Many repeat orders. Collecting fumes at the source with local exhaust hoods has proven most practical in operation. It is particularly helpful in winter months when doors and windows are closed.

Write for Bulletin 37-E describing all types of Ruemelin Fume Collectors.

RUEMELIN MFG. CO., 3996 NO. PALMER ST. • MILWAUKEE 12, WIS., U. S. A.
Mfrs. & Engr. • Sand Blast & Dust Collecting Equipment

For more data circle 540 on Reader Service Card

new shop equipment . . .

wheels. The head is small and compact and is said to be ideal for carrying to the work when it is not practical to bring the work to the tool. According to the manufacturer, simplicity has been achieved through the elimination of spring-loaded retaining pawls or locking levers used on previous models. A single locking pin which maintains stamping alignment is withdrawn to rotate wheels for set up. The locking pin, it is claimed, also supplements the main shaft in absorbing shock when stamping. Friction discs between the wheels prevent rotation of adjacent wheels as a single is indexed.

The numbering device incorporates 11 division wheels with engraved char-

acters 1 through 0 and one blank space. On special order, dashes may be included in place of the blank space or a special selection of letters may be obtained. The unit is currently available in 3/32 and 1/8-inch character sizes. Additional character sizes will be available at a later date.

For more data circle 41 on Reader Service Card

★ ★ ★

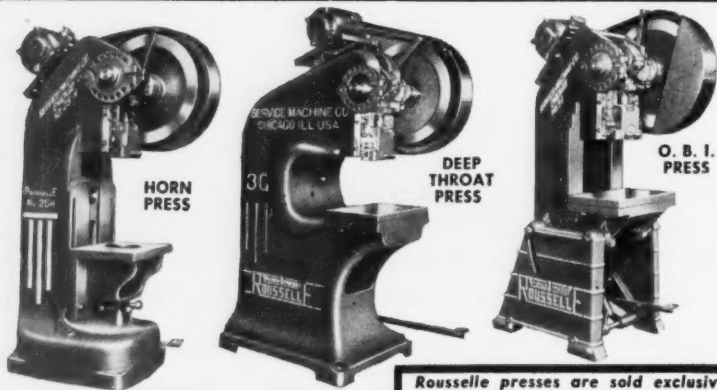
TOOLHOLDER FEATURES ADJUSTABLE ADAPTER SHANK

Burg Tool Mfg. Co., P.O. Box 48, Gardena Station, Gardena, Calif., has announced the availability of a "Tool-flex" Adjustable Adapter Shank Toolholder for multiple-spindle applications that can be supplied in a full line of sizes with Morse taper sleeve and

★ ★ ★ ★ ★

Expect *More* with a **ROUSSELLE**
More strength where it counts...
More accuracy where it's needed...
More simplicity where it helps...
...to turn out first rate work **FAST**
with steady, dependable regularity

You'll like the economical run-of-job cost, the simpler maintenance, the easier set up and operation and the wider variety of work each one can handle. And YOU'LL LIKE THE PRICE when you compare Rousselle specifications and quality . . . Ask for condensed catalog.



Rousselle presses are sold exclusively through leading machinery dealers.

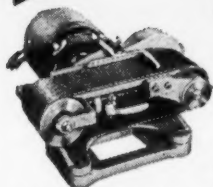
SERVICE MACHINE CO.

Mfrs. of Rousselle Presses

2310 West 78th Street - Chicago 20, Ill.

For more data circle 541 on Reader Service Card

**DOES IT BETTER
DOES IT FASTER**



SIMPLEX-M ABRASIVE BAND GRINDER

The precision of a machine tool plus the durability of a workhorse. Complete with 1/2 H.P. Heavy Duty Motor and automatic band tension control. Nothing like it for finishing metals, plastics, wood, fibre, etc.

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MANUAL ON FINISHING—WRITE TODAY**

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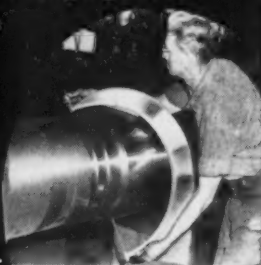
HOLLOW-FRAME MICROMETERS

Reduce Gaging Errors

Up to 50% less weight

Lessens fatigue, assures accurate gaging, better balance and feel

Minimizes expansion and contraction

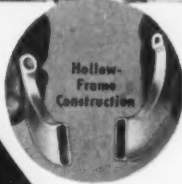


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DoALL**

see classified phone directory for nearest of 38 DoALL Service-Stores that stock gages, cutting tools, supplies—

Or Write:

The DoALL Co.
Des Plaines, Ill.



Sizes up
to 96"

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PRECISION!

Precision means excessive exactness, the QUALITY reflected in this STANDARD DRILLMASTER machine now in operation in a large automotive manufacturing plant. This STANDARD DRILLMASTER 4-Station machine is designed for spotfacing and chamfering connecting rods.

The machine is equipped with a 36-inch hydraulic Index Table, carrying a 4-Station, 4-Position fixture with automatic clamping and unclamping. Mounted in the vertical column is a 24-Spindle Head, complete with Bushing Plate, having special anti-friction bearing type bushings for tool support and alignment.

Hydraulics and Electrics are to J.I.C. standards. John S. Barnes hydraulics are employed. Production is 460 pieces per hour net.

WRITE FOR COMPLETE TECHNICAL INFORMATION.

STANDARD MACHINE S.O. 4555

UNITED STATES SALES REPRESENTATIVES: ARNOLD J. WERNER CO., NEW CENTER BUILDING, DETROIT 2, MICHIGAN

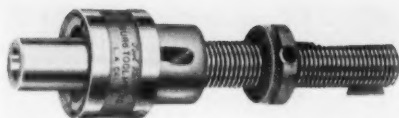


**STANDARD
MACHINE AND
TOOL CO., LTD.
WINDSOR, ONTARIO**

For more data circle 544 on Reader Service Card

new shop equipment . . .

straight bore or tap collets. The toolholder is said to be ideal for close center applications and can operate where the center distance is as close as $\frac{7}{8}$ inch. The holder is simply constructed, having only four main parts. An oil, heat and wear resistant Neoprene



**Burg "Toolflex" Adjustable Adapter
Shank Toolholder**

insert, it is claimed, provides universal float that corrects for both parallel and angular misalignment, preventing bell mouthing and oversize holes or torn and oversize threads. According to the manufacturer, the insert also increases tool life by absorbing shock.

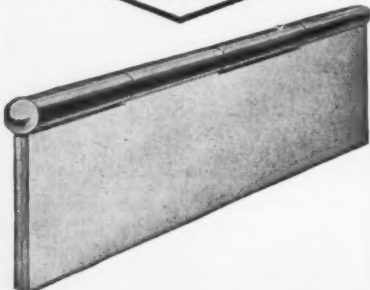
For more data circle 42 on Reader Service Card

★ ★ ★

CLUTCH FEATURES STAMPED STEEL COVER

Lipe-Rollway Corp., 806 Emerson Ave., Syracuse 1, N. Y., has announced that its 13-inch DP (direct pressure) clutch is now being produced with a stamped steel cover instead of cast iron. The stamped steel cover, it is claimed, satisfies the need for stronger clutch covers to minimize the problem of centrifugal burst, keeps crankshaft inertia weight as low as possible and provides efficient production and balancing methods. According to the manufacturer, the stamped steel cover plate as-

(Continued on page 312.)



CONTINUOUS HINGES

Manufactured by
**AUTO MOULDING
& MFG. CO.**

WRITE FOR CATALOG
1114 E. 87TH ST. CHICAGO 19

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COLLET STOPS

(PATENT PENDING)

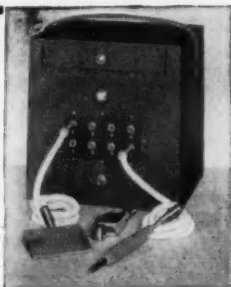
Used with collets for second operation work. Assuring consistent accuracy, permanent setup, producing identical results. No alterations to your collets are necessary. Fully adjustable. Available for any size collets, solid and spring ejector types. END GUESS WORK AND REJECTS.

OTHER WOHLNIP PRODUCTS: Non-Rotating Drill Stops, Work Holder Clamps, Drill Extractors.

WOHLNIP PRODUCTS, INC. 634 CENTRAL AVENUE
EAST ORANGE, N. J.

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Etchograph
WAY

Original Electric Etcher, Thousands in Daily Use
Mark hardened parts, tools, dies, gages
and fixtures of any ferrous metals including
the hardest alloys and carbides—
quickly—plainly. • Three sizes to meet
all requirements.

• Write for circulars and prices.

BREWSTER-SQUIRES CO.

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Tenafly, N. J.

Toolmaker's Microscope

Made by Bausch & Lomb..

Sold by DoALL

for Examination and Measurement
in the shop,
in the lab

- Speeds work
- Reduces error
- Unreversed image
- Cannot damage delicate parts



Call DoALL — consult
yellow directory for nearest
DoALL Service Store
that stocks cutting tools,
gages, supplies—on Write

The **DoALL** Co.

Des Plaines, Ill.



For more data circle 547 on Reader Service Card

For more data circle 548 on Reader Service Card

HANCHETT

for all metal cutting

Metal Saw Sharpeners

(Hot and Cold Saws)

For Automatic Grinding of Cold Metal
Saws.

Rigid — Accurate — Fast.

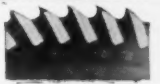
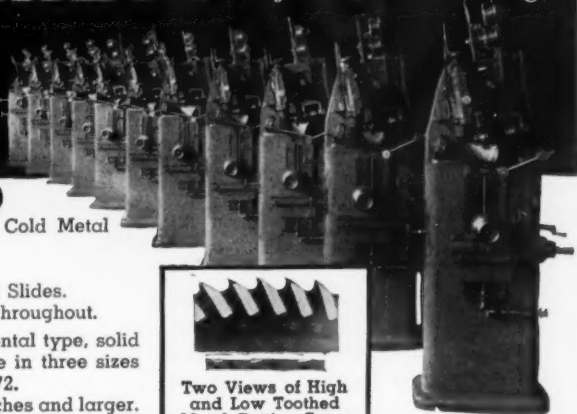
Ball Bearing Mounted Head Slides.

Heavy Duty Construction Throughout.

For inserted tooth, segmental type, solid
tooth circular saws made in three sizes
—Models 1130, 1160, 1172.

Saw capacities 8 to 72 inches and larger.

Other Models—Hot and Cold Saws, No.
12 and No. 572 (all sizes).



Two Views of High
and Low Toothed
Metal Cutting Saws

HANCHETT MANUFACTURING COMPANY

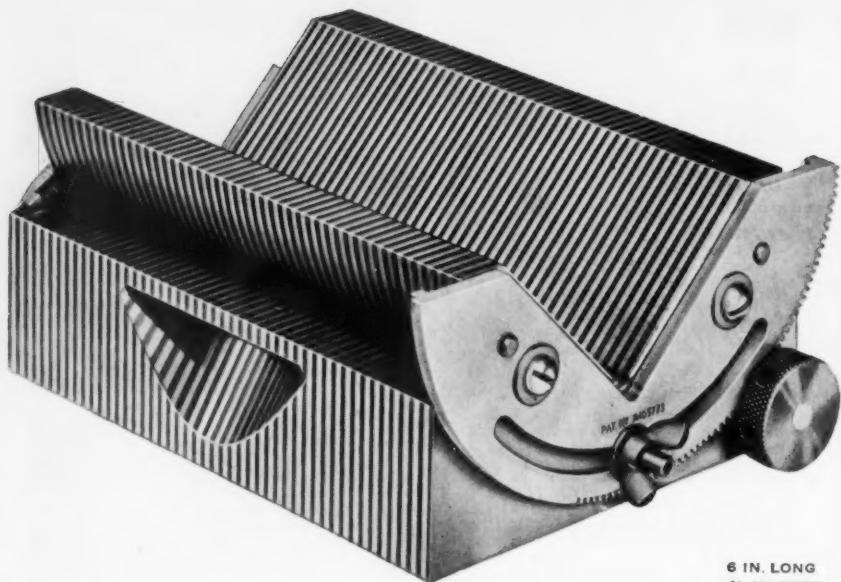
World's Largest Manufacturers of Shear Blade, Knife and Saw Grinding Machinery

MAIN OFFICE — Big Rapids, Michigan

WEST COAST — Portland 1, Oregon

For more data circle 549 on Reader Service Card





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4½ IN. WIDE
2½ IN. HIGH

PRECISION Adjustable Magnetic V-Block

For the first time, you can equip your shop or laboratory with a *precision* Magnetic Adjustable V-Block. This instrument permits your development of profitable new work of close tolerance nature previously impossible with available equipment. In addition, the Anton Magnetic Adjustable V-Block will reduce time and cost in your present grinding operations.

Write for illustrated catalog sheet listing price, features and specifications and showing how you can reduce costs and improve quality.

Anton Machine Works

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Peaslee TAPER PINS



**STANDARD
AND
SPECIAL**

Stainless Steel
PRECISION GROUND

ALSO
SMALL PARTS
DOWELS — STRAIGHT
FORMS
MADE TO BLUEPRINTS



DEALERS INQUIRIES INVITED

PEASLEE METAL PRODUCTS CO.
470 Tolland St.
EAST HARTFORD, CONN.

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DoALL "CLAW-TOOTH" SAW BANDS

Cut Faster • Last Longer

- Teeth pull themselves into work
- Cut metals, woods, plastics
- For all contour and cut-off bandsaws
- An "all-purpose" blade

DoALL has it in stock!

Consult yellow directory for DoALL Sales-Service Store near you



Call or Write
The DoALL Co.
Des Plaines, Ill.

2, 3, 4, 6 pitch
1/4" to 1 1/2" widths
100 ft. coils
or cut and
welded lengths

For more data circle 552 on Reader Service Card



**100%
guaranteed!**

80% faster finish sizing with



ONLY DEKA-BORE

- Can be adjusted in fractions of 1/10,000" on the full diameter as easily as reading 1/16" on a steel rule. *Not a vernier or scroll adjustment.*
- Can be calibrated in increments of .00005 on radii or .0001 on diameter as easily as picking up .002 on a conventional micrometer dial.

Attach this ad to your letterhead and mail for a free demonstration or literature!

PRECISION TOOL & MFG. CO. OF ILL.

1305 S. Laramie Ave., Cicero 50, Illinois

MMS-3

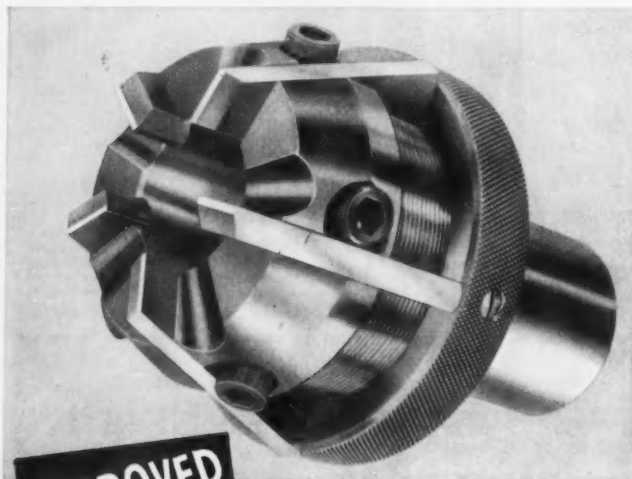
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sembly will hold up to 7,000, 8,000 or even 9,000 r.p.m. before bursting. A mild steel, SAE 1010, which has a tensile strength of 50,000 p.s.i. is used for the stamping.

The steel stampings for cover plate assemblies are said to be more easily produced and balanced than cast iron

cover plate assemblies. Bolt holes are drilled, reamed and burred, and slots for pressure plate lugs are milled for both types of assemblies. However, it is claimed that in the case of steel stampings, one grind, one turn and 15 drill operations are eliminated. The stamped steel covers are interchangeable,

even after balancing. Since cast covers are balanced by drilling the out-of-balance side of the cover, they cannot be readily salvaged for use on a rebuilt clutch. To balance an assembled Lipe stamped cover plate assembly, the area of out-of-balance is compensated for by plugging one of the cover's vent holes with a small steel plug of proper weight. The final step is to arc-weld the plug



IMPROVED

GENESEE Adjustable Hollow Mill

There is a size and style Genesee for every hollow milling job. Standard sizes from 0 to 2", standard with straight or Morse Taper shanks carried in stock.

- Quick — easy adjustment
- Simple sharpening method
- High speed steel—cast-alloy — Carbide tipped blades
- Let our Engineering Department solve your Production tool problems

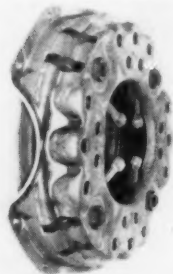
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GENESEE MANUFACTURING COMPANY

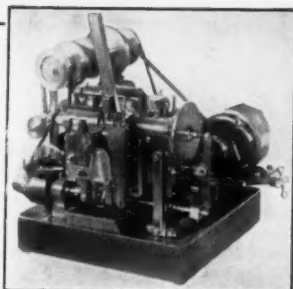
566 HOLLENBECK ST. • ROCHESTER 21, N. Y.

Adjustable Hollow Mills • Facing and Counterboring Tools • Special Production Tools

For more data circle 554 on Reader Service Card



**Lipe-Rollway
13-Inch DP Clutch
with stamped
steel cover**



WALTHAM

Pinion and Gear Cutting Machines

with revolving cutter will make 1, 2 or 3 successive cuts for watch pinions or may be used for fine pitch gears up to 1 1/2" dia. Blanks are held and indexed by work spindle and usually supported by a tail center. Only straight teeth can be cut.

WALTHAM MACHINE WORKS, INC.

BOX 48 • WALTHAM, MASS.

Pinion and Gear Cutting Machine, Thread Milling Machine, Cylindrical Sub-Presses, Cutter Sharpening Machine, Small thread milling and gear cutters, Small special machinery.

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DoALL GAGE BLOCKS

Unsurpassed Accuracy

• Another precision product manufactured by DoALL

• Rectangular type

• Grades AA, A and B

• Complete line of accessories



18 Sets
3 to 118
pieces

Blocks
up to 10"
long

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Gage Block
Height Tables
\$2.95

Science of
Precision
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\$3.50

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DoALL



See classified phone directory for nearest DoALL Service-Store — complete stock of gages, cutting tools, supplies.

The DoALL Co.
New Rochelle, N.Y.

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STEEL PRESS BRAKES

43 Standard Sizes

Readily adapted for a wide variety of bending, forming drawing, notching, blanking, punching, embossing, etc.

DIES Complete Line of Induction Hardened Dies for All Makes and Sizes of PRESS BRAKES.



4014

DREIS & KRUMP

MANUFACTURING COMPANY

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CHICAGO
STEEL BENDING BRAKES
BOX and PAN BRAKES
PRESS BRAKES

March, 1955

For more data circle 557 on Reader Service Card

MODERN MACHINE SHOP 313

new shop equipment . . .

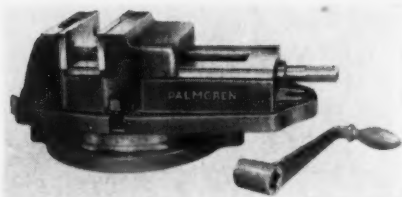
to the cover. The plug can be removed, allowing the cover to be re-balanced for assembly on a rebuilt clutch.

For more data circle 43 on Reader Service Card



MILLING MACHINE VISE IS DESIGNED FOR HEAVY-DUTY SERVICE

Chicago Tool and Engineering Co., 8383 S. Chicago Ave., Chicago 17, Ill. has announced the "Palmgren" No. 40B Flanged Milling Machine Vise which has a swivel base and which is precision built for heavy duty service, such as milling, drilling, grinding and other machine operations that require a rugged holding device. The vise has jaws 4 inches wide that open 4 inches.



"Palmgren" No. 40B Flanged Milling Machine Vise with Swivel Base

Jaw depth is 1½ inches. The overall length of the vise body is 13½ inches, the overall width is 6¾ inches and the overall height with swivel base is 5½ inches. Removable ground steel jaw plates are provided, and the heavy Acme thread adjusting screw is equipped with a replaceable screw bushing.

The vise is provided with flanges for clamping down to the machine table. The unit may be used with or without the 360-degree graduated swi-

RECLINABLE POWER PRESSES



Ideal for general stamping work . . . 4 to 100 tons capacity. Can recline to 40° with perfect safety.

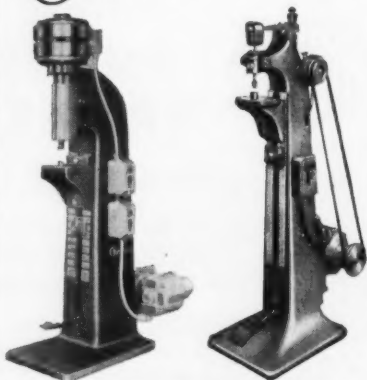
Our catalog contains a wide variety of press types and sizes. Write for it today.

✱ **51st** year serving worldwide industry with Patent Percussion, Open Back, Double Crank, Punch, Horn, Toggle and Straight Side Presses, Dial and Roll Feeds.

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THE GRANT MFG. & MACHINE CO.
96 Silliman Ave. Bridgeport 5, Conn.

For more data circle 559 on Reader Service Card

TESTING?

you need the . . .

ACROMARKER

(Reg. U.S. Pat. Off.)



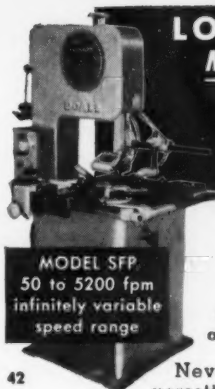
to stamp the tags that record your findings.

"Thousands are in use for stamping name-plates, tools, machine parts, dials, instrument parts, signal system tags, tool checks, etc."

ORDER YOURS NOW

the
ACROMARK
Company

9 Morrell St., Elizabeth 4, N. J.



LOW COST

Multi-Purpose

16" DoALL

Contour

Band

Machine

- Saws
- Slices
- Files
- Polishes

Perfect for toolrooms and light production

MODEL SFP
50 to 5200 fpm
infinitely variable
speed range

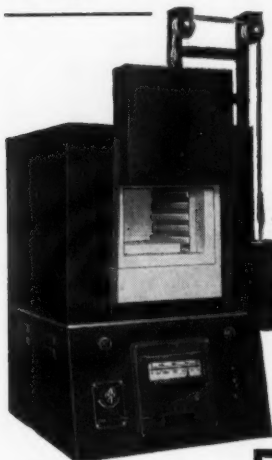
42

Never before such versatility at this price — widest range of attachments available to do unlimited band machining jobs. 5 models — fixed and variable speeds. Same quality as the big DoALL's. Ask for Catalog and free Demonstrations. Call your local DoALL Service Store, or write:

DoALL The DoALL Company
Des Plaines, Illinois

For more data circle 560 on Reader Service Card For more data circle 561 on Reader Service Card

Designed for TOOL ROOM EFFICIENCY



HUPPERT Heat Treating FURNACE

Range: 300° F. to 2000° F.

Years of satisfactory operation in tool, die and machine shops, as well as laboratories have proven these furnaces to be ideal for production work. Huppert special features include High Temperature, Heavy Duty Kanthal elements—Multi-insulation—counterweighed and tight self-sealing door. Pilot lights indicate furnace operation. All connections factory installed, shipped ready for operation.

Model No.	Inside Dimensions			KW	Prices 220 volt single phase	
	Wide	High	Deep		with Huppert input controller	with electronic temperature controller
869	8"	6"	9"	4	\$280.00	\$480.00
11	8"	6"	12"	4	287.00	487.00
12*	8"	8"	12"	6	367.00	567.00
12A*	8"	8"	18"	9	471.00	671.00

*For 2300° F. add \$95.00 to No. 12 and \$105.00 to No. 12A.
No. 12A can be furnished for 3 phase at no additional cost.
For floor model add \$50.00 to above prices.

• Write for literature on complete line of furnaces and ovens. Ask for Hints on Heat Treating.

K. H. HUPPERT CO.

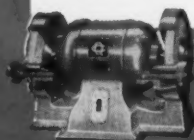
6841 Cottage Grove Avenue

Chicago 37, Illinois

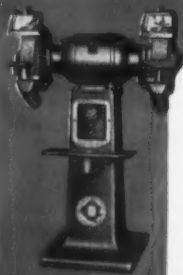
Manufacturers of Electric Furnaces and Ovens

For more data circle 562 on Reader Service Card

**Save
up to
30%**



Heavy Duty
Bench Grinder



Heavy Duty
Floor Grinder

**cost
less
to own
and
operate**

Queen City

grinders and buffers

So good they're guaranteed: "try one for 30 days . . . if you're not satisfied, return it." It makes cents . . . and dollars . . . to buy equipment like that at prices 20 to 30% under competing makes!

The complete range of Queen City Grinders and Buffers . . . floor and bench types . . . is described in newly-revised literature.

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QUEEN CITY MACHINE TOOL CO.

3911 Kellogg Avenue, Cincinnati 26, Ohio

"High Quality—Low Cost—For over 50 Years"
For more data circle 563 on Reader Service Card

new shop equipment . . .

vel base. The swivel base is equipped with two bolt lugs for clamping to the machine and is also furnished with two 11/16-inch keys and screws to fit machine table slots.

For more data circle 44 on Reader Service Card

★ ★ ★

DRILL PRESS IS HEAVY-DUTY PRECISION-BUILT MACHINE

Universal Gear Works, Inc., 1309 E. McNichols Rd., Detroit 5, Mich., has announced the 1600 Series Heavy-Duty Precision Drill Press which is available in bench and floor models with standard or production tables. The machine is available in single or multiple spindle types and has a full 16-inch swing and a spindle travel of 6 inches. A tilting table on all models and a table rais-

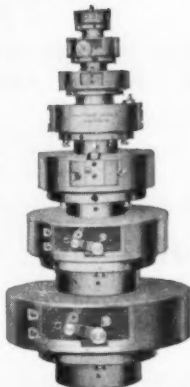


Universal 1600 Series Heavy-Duty Drill Presses

MUMMERT-DIXON FACINGHEADS

Two-way tool feed
in 9, 12, 16, 20, 24,
30, 36, 40 and 46
sizes.

One-way tool feed
in 6, 9 and 12 sizes.
Automatic feed —
convenient tool ad-
justment — quick
feed reverse. Save
time and costly set-
ups.



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folder.

MUMMERT-DIXON CO.

120 PHILADELPHIA ST. • HANOVER, PA.

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BROACHES

... Designed
... Manufactured
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We are fully equipped for
PRODUCTION BROACHING

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... Surface

Dependable Quality and Service
All inquiries handled promptly

RADCO CORPORATION

856 N. Spaulding Ave., Chicago 51, Ill.

Also designers and manufacturers of
Forming Tools
Circular — Flat — Dovetail

For more data circle 565 on Reader Service Card

March, 1955



ACTUAL SIZE



Attach this page to
your letterhead and
forward for our new
16 page catalog

CONICAL TOOL CO.

3802 Buchanan S.W.
Grand Rapids 8, Michigan

For more data circle 566 on Reader Service Card

MODERN MACHINE SHOP 317

new shop equipment . . .

ing mechanism on production models are furnished as standard equipment. The unit has a capacity of 1/2 inch and may be supplied with a Jacobs chuck or No. 1 Morse taper spindle.

A heavy-duty push-button motor switch is built into the head of the machine. Other features include adjustable spindle return stop, quill lock han-

dle, four precision ball bearings with sealed in lubrication on spindle, micrometer-type depth stop with quick adjustment, vernier movement.

For more data circle 45 on Reader Service Card

★ ★ ★

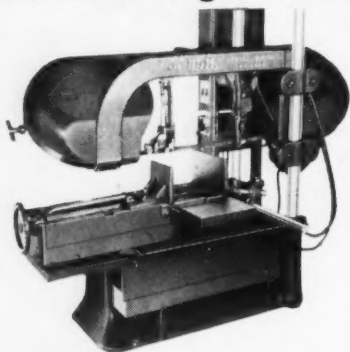
RUST PREVENTIVE IS EFFECTIVE IN BOTH OIL AND WATER

Designated as Rust-Lick "C-W-25," a rust preventive compound which is

soluble in both water and Stoddard solvent and which is effective in both the oil and water phase has been announced by Production Specialties, Inc., 755 Boylston St., Boston 16, Mass. The compound is formulated from sulphonates, polar compounds, solvent extracted petroleum oil, surface active agents, anti-oxidants and corrosion inhibitors. It is applied at room temperature by brushing, dipping or spraying.

The compound is non-toxic, and when used as an aqueous solution, it is non-flammable. Upon drying, a thin oily film of the concentrate will plate-out and protect the surface from corrosion for long periods during indoor

New Ease of Control With the Wells Model 1200 Metal Cutting Band Saw

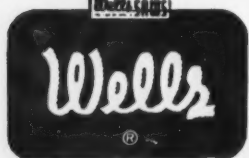


The Wells model 1200 is a rugged, new horizontal band saw for heavy-duty production cutting. It incorporates all the advantages of the Wells No. 12 plus such outstanding advancements as Finger-Tip Control and greater safety with 110 Volts at the controls. And with the flip of a switch, the model 1200 becomes a completely automatic machine with continuous operation for duplicate cutting when used with the Wells-O-Bar Feed Master stock projection unit.

Call your Wells Distributor or write for Job-Engineering Service.

See us at Booth 559

Western Metal Exposition



The Pioneers of Horizontal

METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
808 TYLER ST. THREE RIVERS, MICH.

For more data circle 567 on Reader Service Card



THIS FILE SETTING SQUARE

Puts the ALL AMERICAN
Precision Filing Machine
IN A CLASS BY ITSELF!

Crooked, bent, curved
file shanks present no prob-
lem for this machine. Pat-
ented universal joint file
clamp and file setting square
assure true and vertical
position of file or
other tool in a mat-
ter of seconds.

Hones and saws too.

Neoprene bellows

keeps dirt and

chips out of oil-

filled housing and

supplies air to chip

blower. Two overarms—one to hold top

of hones and saws—the other to back up file or

hone or to guide saw. Highly accurate. Time-

saving. Send for literature.

Manufacturers of

All American Vibration Fatigue Test Machines



**ALL AMERICAN
Tool & Manufacturing Co.**

8043 Lawndale Avenue, Skokie, Ill.

For more data circle 568 on Reader Service Card

Standardize on

hall COLLET CHUCKS

for
**SPEED,
ACCURACY,
ECONOMY**



**Automatic adjustment speeds
up production** in multiple op-
erations with push-out type
HALL COLLET CHUCKS. Full
spindle capacity or over.

Tremendous grip over
or under stock size
to .007—without ad-
justments. All grip
...no slip. No bear-
ings...no heat or
lost power. Instant
release without stop-
ping lathe.

SATISFACTION GUARANTEED!

Made in Two Sizes to Fit Your Requirements:

Model A...1" (max. capacity 1-1/16")

Model B...2" (max. capacity 2-1/16")

Round, square or hexagon collets, plain or serrated

No. 3 Collet Pads Now Available

Write today for illustrated catalog and price list—Dept. B-1.

HALL MANUFACTURING COMPANY

422 TULAROSA DRIVE, LOS ANGELES 26, CALIFORNIA

For more data circle 569 on Reader Service Card

March, 1955

GAMMONS TAPER REAMERS for all types of die work



- Specially treated
for modern die
steels.
- Rapid cutting
capacity.
- Large range of
standard sizes.
- Tapers per inch:
.005, .008, .013.

GAMMONS • HOAGLUND CO.

MANCHESTER 2, CONN.
Manufacturers of helical taper pin, chucking,
die makers and special reamers.

For more data circle 570 on Reader Service Card

MODERN MACHINE SHOP 319

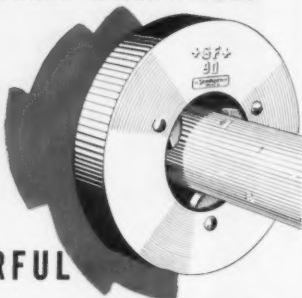
SKINNER +GF+ WORK DRIVERS

SAFE

EASY

FAST

POWERFUL



The Best for Turning on Centers

+GF+ Work Drivers drive smooth or rough bars and forgings located on centers. Jaws are easily reversed to accommodate direction of spindle rotation.

NOTE WIDE RANGES!

Type 36	$\frac{1}{4}$ " to $1\frac{1}{16}$ "
Type 60	$\frac{5}{16}$ " to $2\frac{3}{8}$ "
Type 90	$\frac{1}{2}$ " to $3\frac{9}{16}$ "
Type 140	$1\frac{1}{16}$ " to $5\frac{1}{2}$ "
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Skinner Booth

THE CREST



No. 1808
ASTE Show

OF QUALITY

THE SKINNER CHUCK COMPANY

210 Edgewood Avenue, New Britain, Conn.

For more data circle 571 on Reader Service Card

new shop equipment . . .

storage. If moisture through condensation and high humidity comes in contact with treated surfaces, the protective film, it is claimed, will absorb and inhibit the moisture to prevent rust. The film can be easily removed, when necessary, with conventional alkaline or emulsion cleaners and solvent degreasers. Rust-Lick "C-W-25" is recommended for protection against rust for iron and steel raw stock, bars, sheets, wire and cold rolled strips, as well as for finished parts, tools, gears and components, during indoor storage and while in transit.

For more data circle 46 on Reader Service Card

★ ★ ★

INDICATING MICROMETER PROVIDES "VISIBLE FEEL" TO THE USER

Designated as the "Master Compar," an indicating micrometer which is said to provide "visible feel" to the user and which has a range from 0 to 1 inch, reading in 0.0001-inch increments, has been announced by George Scherr Co., Inc., 200-MM Lafayette St., New York 12, N. Y. According to the manufacturer, "tenths" can be easily and unmistakably read from an extra large dial. The indicating mechanism of the instrument is said to control the measuring pressure so that all uncertainties due to difference in "feel" of individuals are eliminated. The tool is also claimed to provide the user with a complete set of "go" and "no go" gages of 1 inch range. The micrometer can be used for detecting out-of-roundness, ovalness and taper. The release button for the movable anvil is on the right-hand side of the instrument, making it a right-hand tool and enabling the operator to hold it the conventional way.

For **SAFETY** in marking all kinds of Metal

Use **SAFETY "HEVI-BEVL" LETTERS and FIGURES**



The most economical all purpose grade of Safety Letters and Figures. Will give outstanding service on almost any marking job. All sizes — 1/4" to 1" characters from stock. Mecco Safety Steel for No Spalling and No Mushrooming. Write for Catalog 100

- No Spall
- No Mushroom
- More Service
- Thumb Side Marks for easy identification

Mecco SAFETY MARKING TOOLS **M.E.CUNNINGHAM CO.**

1051 CHATEAU STREET, PITTSBURGH 33, PA.
For more data circle 572 on Reader Service Card

Save your large JIG BORERS for large jobs... put small precision work on the LINLEY



The Linley Jig Borer provides the means . . . at very low cost . . . of handling your most exacting requirements in precision. With it you can cut costs through having a tool exactly fitted to your small work . . . save your larger machines for larger work.

Specifications

Table Movement: 6" x 10"	Table Size: 7" x 17 1/2"
-----------------------------	-----------------------------

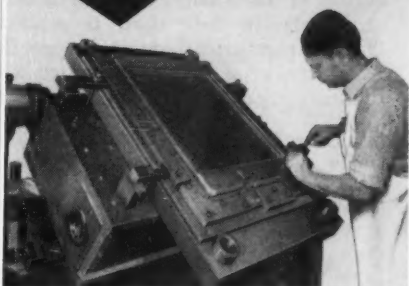
Send for complete information TODAY!

LINLEY BROTHERS CO.
661 STATE ST. EXT., BRIDGEPORT 1, CONN.

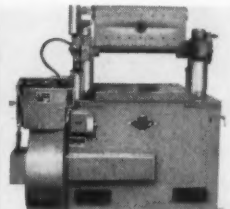
For more data circle 573 on Reader Service Card

March, 1955

The modern way to tryout and finish dies is the ALPHA way

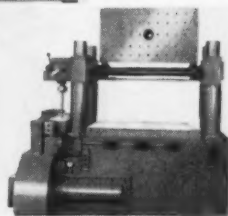


Barber, shear, fit and finish both die members without removing dies from the press. That is why you get faster, more economical production with Alpha Die Tryout Presses.



2 post press
50, 75, 100 tons

4 post press
100, 150,
200 tons



Full details in this free, illustrated folder.

ALPHA
PRESS & MACHINE, INC.
9281 Freeland Ave., Detroit, 28, Mich.

For more data circle 574 on Reader Service Card

MODERN MACHINE SHOP 321

new shop equipment . . .

Resetting to zero is said to be accomplished by means of a screw on the bottom of the housing and can be done accurately in less than 5 seconds. Heavy tungsten carbide anvils and finished hardwood case are supplied with the instrument as standard equipment.

CAMS

MADE TO YOUR SPECIFICATIONS

— Except Screw Machine Cams —

Design Assistance Offered

KIDDE PRECISION TOOL CORP.

37 Farrand St. Bloomfield, N. J.

For more data circle 575 on Reader Service Card

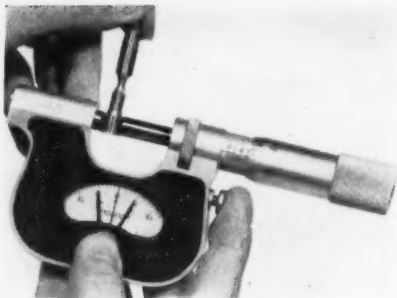
MARK and DEMAGNETIZE IN ONE OPERATION



The Luma combination etchtool and demagnetizer, etches, demagnetizes, anneals and solders. Permanently marks hardest steel with ease of a pencil. Write for complete information.

Luma Electric Equipment Co.
P. O. BOX 132-MS TOLEDO 1, OHIO

For more data circle 576 on Reader Service Card



"Master Compar" Indicating Micrometer

Larger size micrometers up to 4 inches are furnished with a removable indicator.

For more data circle 47 on Reader Service Card

★ ★ ★

CAST IRON LAPS ARE AVAILABLE FOR HONING

Increased versatility for honing machines is afforded by the introduction of cast iron laps by Superior Hone Corp., 1614 Elreno St., Elkhart, Ind. Lapping and honing on the same machine are now possible. It is only necessary to release the cap, remove the stone and insert the cast iron lap to proceed with lap work. The need of a lapping machine or individual head for setting up laps is said to be eliminated.

(Continued on page 328.)

LW

SWIVEL BASE MILLING MACHINE VISES

As low as
\$24.00

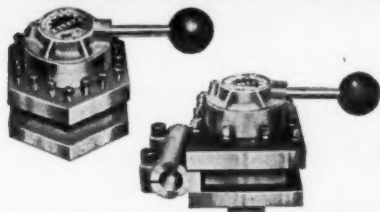
Send for free catalog on vises, power hack saws, magnetic chucks, dividing heads.



L-W CHUCK COMPANY
28 SO. ST. CLAIR STREET TOLEDO 4, OHIO

For more data circle 577 on Reader Service Card

"WEDGE-LOCK" TURRET



Does not raise up when indexing in all 12 positions. 4-way and 6-way block models. Repetitive accuracy to within .0003 plus or minus within itself.

WRITE FOR FOLDER

Makers of Combination Rotary Tables and Angle Plates. Also Helical Gear Speed Reducers, Single and Double Reduction. Also Special Gears of All Types.

Open territory available to representatives.

OLSON INDUSTRIAL PRODUCTS, INC.

40 W. WATER ST. • WAKEFIELD, MASS.

For more data circle 578 on Reader Service Card

PART FEEDER

Automatic Part Feeders are adaptable to production jobs requiring the handling of small into hopper are arranged and fed down track in proper order.



Single & Multiple Spindle Magazine Feed Power Screw Driving Machines

For driving screws faster in products assembled with screws. These machines operate easily and require very little attention or adjustment when put in production.

Send sample parts when writing for quotation.



COOK & CHICK CO.

2415 WEST 24TH ST., CHICAGO 8, ILL.

For more data circle 579 on Reader Service Card

ENGINEERED

Live Centers



SHANK
OIL SEAL
LARGE THRUST BEARING
LARGE RADIAL BEARING
CUSHION ACTION
ALLOY STEEL . . .
ROUND TRUE WITH BEARINGS

Standard shanks with Morse tapers carried in stock . . . send us your specifications and blueprints . . . we will see that your job is set up with the right LIVE CENTER

For more data circle 580 on Reader Service Card

March, 1955

STURDIMATIC
TOOL COMPANY

3904 F STREET • DETROIT 16, MICH.

MODERN MACHINE SHOP 323

new literature

Use the Reader Service Cards opposite the covers for requesting free copies of the literature described below.

48. Circular Graduating Machine

Abrasive Machine Tool Co., 20 Dunellin Rd., East Providence 14, R. I. 4-page bulletin describing the Model GC Circular Graduating Machine for accurately and quickly graduating knobs, handwheels and similar parts.

49. Drill Bushings

Catalog and price list covering its line of drill bushings. Acme Industrial Co., 212 N. Laflin St., Chicago 7, Illinois.

50. Adjustable Clamps

Adjustable Clamp Co., 436 N. Ashland Ave., Chicago 22, Ill. 32-page catalog describing adjustable clamps.

51. Soluble Oils

Aldridge Industrial Oils, Inc., 3401 W. 140th St., Cleveland 11, Ohio. Folder describing soluble oils and other cutting and grinding fluids.

52. Drill Rod

Descriptive leaflet on high speed, carbon and alloy steel drill rod, providing data on grades, lengths, size ranges, finishes and tolerances. Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Dept. MS, Pittsburgh 22, Pennsylvania.

53. Grinding Wheels

Illustrated 20-page catalog and price list on a complete line of grinding wheels. Atlantic Abrasive Corp., South Braintree, Massachusetts.

54. Unidirectional Motors

Barber-Colman Co., Small Motors Division, 6511 Rock St., Rockford, Ill. Bulletin (No. F 3959-2) describing Barcol Heavy-Duty Type YAR Motors.

55. Carbide Grades

Booklet showing selection of the proper grade of cemented carbide for use as a cutting tool for a particular job. Carbology Department of General Electric Co., 11143 E. 8 Mile Ave., Detroit 32, Michigan.

56. Grinding Wheels

Colonial Abrasive Products Co., 6th and Harry Sts., Conshohocken, Pa. Illustrated 4-page bulletin describing "Grindaway" Grinding Wheels which are reinforced with safety rings.

57. Surface Broaching Machines

Colonial Broach Co., Detroit 13, Mich. Bulletin (No. RS-54) covers the improved and expanded line of its single-ram surface broaching machines.

58. Press Brakes and Shears

Columbia Division, The Lodge & Shipley Co., Hamilton, Ohio. Spiral-bound catalog discussing its line of power press brakes, power squaring shears and shear accessories.

59. Pulley Lagging

Condensite Engineering Corp., 2013-2015 Chancellor St., Philadelphia 3, Pa. Folder describing pulley lagging.

60. Cut-Off Machines

Continental Machine Co., 1952 N. Maud Ave., Chicago 14, Ill. 8-page catalog covering its line of high-speed pipe and tube cut-off machines and accessories.

61. Sectionized Automation

Illustrated booklet discussing sectionized automation, a Cross development based on the division of a machine into sections. The Cross Co., Detroit 7, Michigan.

62. Electric-Hydraulic Press

Illustrated bulletin (No. 347) describing the "Elec-draulic" Press. Dake Engine Co., 612 Seventh St., Grand Haven, Mich. Specifications are included.

63. Hydraulic Press

The Denison Engineering Co., Columbus 16, Ohio. 24-page catalog showing how many manufacturing problems can be solved through use of the "Multipress."

64. Cold Degreasing Solvent

The Dow Chemical Co., Midland, Mich. Pamphlet on Chlorothene (Dow Inhibited 1, 1, 1-Trichloroethane), a cold degreasing solvent for cold cleaning, dip cleaning and bucket cleaning operations.

65. Broaches

Illustrated 16-page catalog covering "Minute Man" keyway broach kits, square broaches, special broaches and a magnetic base. The du Mont Corp., Greenfield, Massachusetts.

66. Cylindrical Plug Gages

Eastern Precision Gage Co., Elizabeth 2, N. J. 16-page catalog on cylindrical plug gages, special tools, dies and fixtures.

67. Lifting Equipment

Economy Engineering Co., 4507 W. Lake St., Chicago 24, Ill. 40-page catalog (No. 55) covering its complete line of materials handling and overhead service machines.

68. Short Run Stampings

Federal Tool and Mfg. Co., 3600 Alabama Ave., Minneapolis, Minn. Services Bulletin (No. 161) describing the facilities that make Federal a "one-stop" stamping service.

69. High Speed Index Tables

Ferguson Machine & Tool Co., Roller Gear Division, P.O. Box 191, St. Louis 21, Mo. Catalog (No. 300) describes the Ferguson "Intermittor," standard precision index table for high speed production.

70. O-Rings

The Garlock Packing Co., Palmyra, N. Y. Catalog describing Garlock O-rings for dynamic sealing and static gasketing.

71. Multiple-Unit Furnaces

Hevi Duty Electric Co., Milwaukee 1, Wis. Literature covering the Type MU-55 Multiple-Unit Furnaces with controlling pyrometer.

72. Drill Dispenser

Huot Mfg. Co., 538 N. Wheeler St., St. Paul 4, Minn. Catalog sheet covering its drill dispenser which eliminates hunting through stacks of packaged drills for the right size.

73. Die Casting Machines

Bulletin (No. 5400) describes the H-P-M line of die casting machines. The Hydraulic Press Mfg. Co., Mount Gilead, Ohio.

74. Cutter Grinding Aids

The Ingersoll Milling Machine Co., Rockford, Ill. 52-page booklet (No. 59A) describing recommended milling cutter grinds for different materials, types of cuts and quality of finish required.

75. Duplicating Table

J. M. Kalins & Co., 113 E. Washington Ave., Bridgeport 8, Conn. Catalog describing the Regent "Fluid Motion" Duplicator Table for precision duplicating and profiling operations.

76. Taper-Boring Head

John Kis Mfg. Co., Racine, Wis. Folder describing the Model "D" Universal Taper-Boring Head which is designed for use with a jig borer, milling machine or horizontal boring bar.

77. Double Angle Shears

Kling Bros. Engineering Works, 1320 N. Kostner Ave., Chicago 51, Ill. Bulletin (No. 2345) describing double angle shears designed to provide clean cuts on many different shearing operations.

78. Threading Machine

Illustrated 8-page bulletin (No. D-80) covering the 6B Landmaco Threading Machine which features a double spindle. Landis Machine Co., Waynesboro, Pennsylvania.

79. Sandblast Machines

Leiman Bros., Inc., 149 Christie St., Newark 5, N. J. 4-page bulletin (No. 1555) covering the complete line of Leiman sandblast machines.

80. Sand Blast Gun

Lindberg Products Co., P.O. Box 885-M, Los Gatos, Calif. Data sheet describing the "Port a Blast" Sand Blast Gun.

81. Jig Boring Machine

Linley Brothers Co., 671 State St. Ext., Bridgeport 1, Conn. 4-page bulletin describing its jig boring machine which handles a variety of small die work, drilling, reaming, precision boring and other operations. Specifications are included.

82. Air and Hydraulic Cylinders

Miller Fluid Power Co., 2024 N. Hawthorne Ave., Melrose Park, Ill. 4-page catalog covering air and hydraulic cylinders and boosters which are in stock and available for immediate delivery.

83. Dressing Stick

Norton Co., Worcester 6, Mass. 6-page folder describing "Norbidie" dressing sticks for cleaning up wheel faces, forming a radius or groove or touching up a cup or saucer wheel.

84. Hand-Operated Press Brake

Illustrated folder covering a hand-operated Di-Acro Press Brake which develops an 8-ton pressure and uses standard press brake dies. O'Neil-Irwin Mfg. Co., 306 8th Ave., Lake City, Minnesota.

85. Hole Grinder

Onsrud Machine Works, Inc., 3924 Palmer St., Chicago 17, Ill. Bulletin (No. 1126) describing the D1-S Hole Grinder with an adjustable offset head.

86. Angle Comparator

Construction and operation of the Model 118 Angle Comparator is discussed in an 8-page brochure. The Perkin-Elmer Corp., 885 Main Ave., Norwalk, Connecticut.

87. Universal Wet Surface Grinder

Catalog (No. 1955) covering the Model 1000 Universal Wet Surface Grinder which has a large capacity. Peterson Welding Laboratories, Inc., 1423 Virginia Ave., Kansas City, Missouri.

88. Template and Cam Machine

Pratt & Whitney, Division Niles-Bement-Pond Co., 25 Charter Oak Blvd., Hartford 1, Conn. Circular (No. 579) describing the Model 104 electronic template and cam machine.

89. Electric Trucks

The Raymond Corp., 88-131 Madison St., Greene, N. Y. 24-page catalog describing battery-operated, rider-type electric trucks for 6-foot aisle operation, together with attachments for special applications.

90. Surface Grinders

Illustrated 4-page bulletin describing the Model 618 Surface Grinder which is available in four models. Reid Brothers Co., Inc., Beverly, Massachusetts.

91. Punches and Dies

Illustrated 20-page catalog covering Ring Punches and Dies. Ring Punch & Die Co., 108 Foote St., Jamestown, New York.

92. Hydraulic Valves

Illustrated 28-page catalog No. 204) describing a complete line of hydraulic valves in all sizes and types. Rivett Lathe & Grinder, Inc., Dept. MMR, Brighton 35, Boston, Massachusetts.

93. Press Brakes

Brochure describing "Semco" all steel press brakes and forged steel press brake dies. Service Machine Co., Inc., 158 Miller St., Elizabeth, New Jersey.

94. Automation Systems

The Sheffield Corp., Dayton 1, Ohio. 12-page catalog (No. AU-1154) contains data on standard Sheffield control units for automatic machine control, gaging, classifying and segregating processes.

95. Chuck Jaws

The Skinner Chuck Co., 210 Edgewood Ave., New Britain, Conn. Illustrated bulletin (No. SJ-67) on its complete line of soft blank top chuck jaws.

96. Parts Handling and Storage

Stackbin Corp., 1083 Main St., Pawtucket, R. I. 20-page catalog (No. 504) describing the Stackbin System for handling and storing parts and materials.

97. Adjustable Steel Shelving

Standard Pressed Steel Co., Jenkintown 22, Pa. 4-page folder which points up outstanding features of Hallowell adjustable steel shelving.

98. Honing Machine

Illustrated 20-page catalog (No. 1154) discussing the Model "AL" Honing Machine. Superior Hone Corp., 1614 Elreno St., Elkhart, Indiana.

99. Air Gages

Entitled "Automatic Gaging and Size Control," this brochure discusses gaging with CompAIRator Air Gages. The Taft-Peirce Mfg. Co., Woonsocket, Rhode Island.

100. Hand Tapper

Tools, Inc., 1733 N. 25th Ave., Melrose Park, Ill. 4-page catalog describing the Allman Floor Model Hand Tapper.

101. Crankshaft Drill Point Grinder

Union Twist Drill Co., Athol, Mass. Illustrated bulletin (No. DG-01) on a crankshaft drill point grinder with a fixture for grinding conventional points.

102. Steel Stock List

U. S. Steel Supply Division of United States Steel Corp., 208 S. LaSalle St., Chicago 90, Ill. Steel stock list divided into four sections entitled special metals, industrial supplies, prices-references and carbon steels.

103. Gears, Sprockets and Chains

Over 8,000 stock items, including gears, sprockets, chains, splines, racks and worms, are covered in a 200-page catalog. Universal Gear Works, 1309 E. McNichols, Detroit 3, Mich.

104. Retaining Rings

Waldes Kohinoor, Inc., 47-16 Austel Place, Long Island City 1, N. Y. 8-page supplement (No. 1) to Waldes Truarc retaining rings Catalog No. RR 9-52, containing revisions, corrections, additions and new product developments.

105. Metal-Cutting Band Saw

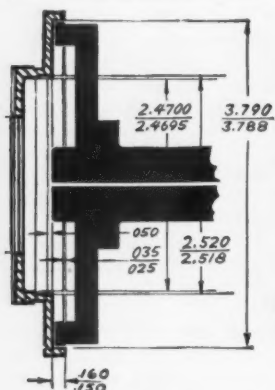
W. F. Wells & Sons, Three Rivers, Mich. 4-page bulletin covering its line of metal-cutting band saws with variable speed drives.

Producing cast iron laps individually to size, stopping the machine and increasing the size as the lap wears or the hole enlarges are claimed to be unnecessary. Using a standard Superior mandrel, the laps are placed directly into the machine.

MACHINE ENGRAVES LARGE-SIZE OR BULKY WORKPIECES

Green Instrument Co., 392 Putnam Ave., Cambridge, Mass., has announced a heavy-duty pantograph engraving machine specifically developed for the engraving of large-size or bulky work-

pieces. Said to offer a simplified design which provides complete freedom and accessibility for working "king size" pieces, the engraver is equally adaptable for continuous heavy-duty production or for the most intricate and delicate engraving, milling or profiling. The machine is operated by simply tracing a master copy with a stylus. A high speed cutter duplicates the master in the ratio desired. The machine can be used for engraving panels, name plates, dials, scales, instruments, instruction plates, signs, tools, jigs and fixtures. It is claimed to be capable of engraving all metals, regardless of hardness, using either high speed steel, carbide or diamond cutters.



Gaging SHALLOW HOLES done easily

to
fractions
of
.0001"



COMTORPLUG with interchangeable expanding plugs to gage simple or special bores from 1/8" to 8" dia.

Unique Advantages

- Positive gaging accuracy to fraction of .0001" regardless of who operates it.
- Indicates actual size, a fixed—not passing—reading.
- Positive 2-point gaging—automatic centering.
- Shallow holes, deep holes, inside splines, open-end holes gaged easily.
- Detects ovality, back or front taper, bell mouth, barrel shape.
- Reaches to bottom of blind holes.
- Gages work while still held in chuck.
- A shop tool for all-day every day use.
- Portable—no wires, hoses or stands.

Investigate the gage used by the thousands in jet engine, automotive transmission, household appliance, farm machinery, guided missile and other volume-precision plants. IT MAKES PRECISION GAGING EASY . . . at machine . . . at inspection bench . . . for selective assembly. No other like it—investigate and see why.

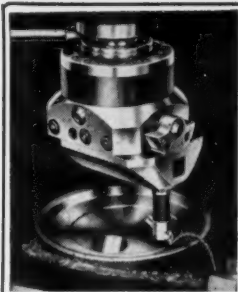
COMTOR COMPANY

64 Farwell St.
WALTHAM 54,
MASS.



GET THE FACTS—REQUEST BULLETIN 48

For more data circle 581 on Reader Service Card



REASONS WHY MODERN ENGINEERS SELECT The Wohlhaupter **MASTERHEAD**

For Precision Work & Most Economical & Automatic Operation

- The MASTERHEAD does Boring, Facing, Recessing, Undercutting, Outside Turning, etc.
 - It does this in One Operation and on One Machine.
 - Automatic Feeds
 - Increases the capacity of your present equipment.
 - Increases Production, makes Better Finished Work.
 - Nine Models available for work up to 3 1/4" diameter.
- Automatic End Release.
- Also taper cutting heads.

Sole Agent

Send for illustrated literature.

KARL A. NEISE, 404 Fourth Ave., Dept. MMS, New York 16, N. Y.

For more data circle 582 on Reader Service Card



DYKEM

STEEL BLUE

Stops Losses

making Dies and Templates

Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead
THE DYKEM COMPANY
2301F North 11th St. • St. Louis 6, Mo.

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2 NEW MAGNETIC BASE LIGHTING UNITS

SEND NOW
FOR FULL
DETAILS



NO. 200



NO. 250



MAGNETIC BASE "HANDI-LITE".
Pull 65 lbs.

- ✓ Mounts to flat or down to 3/4" round surfaces, INSTANTLY!
- ✓ Sure-grip, non-breakable plastic case, 1 1/4" x 1-7/16" x 1 1/2" high.
- ✓ Rayon-flocked shield. 6 ft. cord. AC-DC.

PRICE \$8.50

HEAVY DUTY VERSATILE DUPLEX MAGNETIC BASE LIGHTING UNIT. Pull 125 lbs.

- ✓ Holds up to 100 watt bulb.
- ✓ Non-breakable Tenite plastic case, 1 1/4" x 4" x 1 5/8".
- ✓ Ball & socket flexible stem.
- ✓ Jack-type release.



PRICE \$18.50

Send for Bulletin No 605, covering other Tiny-Titan tools.

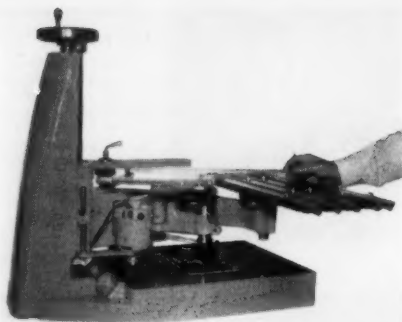
ENCO MANUFACTURING COMPANY, Dept. 135
4520-26 W. Fullerton Ave., CHICAGO 39, ILL.

Sold all over the U.S. and Canada through Enco franchise orders.

For more data circle 584 on Reader Service Card

new shop equipment . . .

According to the manufacturer, the versatility of the machine is virtually unlimited, as its two-dimensional pantograph offers an infinite number of reduction ratios from the master copy ranging from 2 to 1 to infinity. A sin-



Green Heavy-Duty Pantograph Engraving Machine

gle handwheel control easily adjusts both the master copy and the cutting tool vertically in increments of a thousandth of an inch. The machine is open and unobstructed on all three sides.

Accurate Hole Transfer Made Easy With **NIELSEN TRANSFER SCREWS**

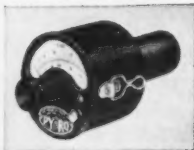
Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduces time and eliminates spoils of other methods. 8 sizes, from 3/16" to 1/4" U.S.S. Inexpensive — Last for years.



Write for Circular
NIELSEN TOOL & DIE COMPANY
P. O. Box 1067
Berkley, Mich.

For more data circle 585 on Reader Service Card

PYRO Radiation Pyrometer



Determines spot temperatures of heat-treating furnaces, fire boxes, kilns and forgings accurately—instantly. No thermocouples, lead wires or accessories needed. Temperature is recorded on direct-reading dial at press of button. Two double ranges. Write for FREE Cat. #100.

The PYROMETER INSTRUMENT Co.
New Plant and Lab., Bergenfield 42, N. J.

For more data circle 586 on Reader Service Card

GEAR RACKS CYLINDRICAL RACKS

Special Gears and Conveyor Sprockets

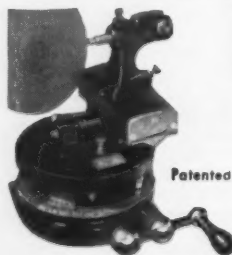
Accurate Gear Works

3149 West Grand Avenue, Chicago 22, Illinois

Sacramento 2-5024

ACCURATE for service and dependability
when you need it!

For more data circle 587 on Reader Service Card



Patented

Flash! APPRENTICE BOY DOES MOST DIFFICULT FORM DRESSING

WITH AUTOMATIC ANGLE TANGENT TO RADIUS DRESSER.

By simply turning a handle, the most difficult profiles, either concave or convex, composed of angles absolutely tangent to a radius, can be dressed **AUTOMATICALLY**. Also, any combination of angles or arcs.

Write for Price and Folder.

Dealers' Inquiries Invited.

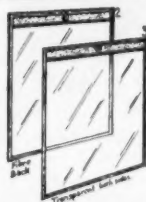
JEON MANUFACTURING COMPANY
Post Office Box 6750
Washington 20, D. C.

For more data circle 588 on Reader Service Card



DRILL THESE HOLES
BY A QUICK, EASY, INEXPENSIVE METHOD
 Your business letterhead will bring literature.
WATTS BROS. TOOL WORKS
 Wilmerding, Pa.

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WADE ENVELOPES

protect
 Shop Orders, Drawings,
 Blueprints, Etc.

Two styles. No. 2 with fibre back, No. 3 transparent both sides. Non-inflammable acetate windows. Special style or size to order.

Write for details.

WADE INSTRUMENT COMPANY

Dept. M, R.F.D. No. 1, Chardon, Ohio

For more data circle 590 on Reader Service Card

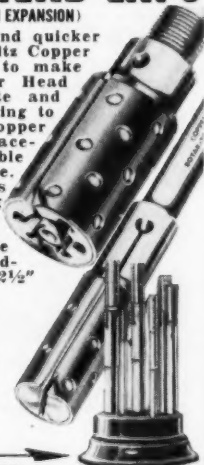
Boyar-Schultz COPPER HEAD LAPS

(STANDARD and EXPANSION)

It is less costly and quicker to use Boyar-Schultz Copper Head Laps, than to make your own. Copper Head Laps are accurate and rapid to use. Nothing to wear out but the copper sleeve which is replaceable and adjustable to the correct size. Adjustment permits maintaining lapping size till worn out and replaced with new ones. Available from stock in standard sizes, $\frac{1}{8}$ " to $2\frac{1}{2}$ " diameters.

SPECIAL TOOL MAKERS BENCH LAP SET

Consists of seven most commonly used sizes — $\frac{1}{8}$ " - $3/16$ "
 $\frac{1}{4}$ " - $5/16$ " - $3/8$ "
 $7/16$ " - $1/2$ ", with enameled die cast base.



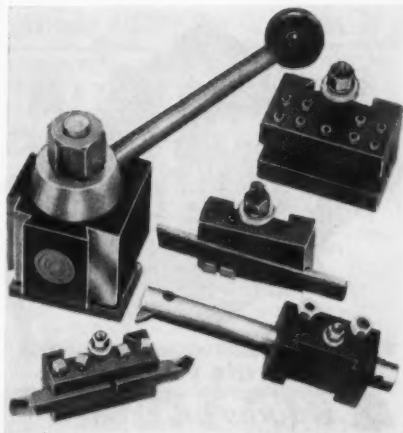
BOYAR-SCHULTZ CORPORATION
 2020 South 25th Ave., Dept. F-L, Broadview, Ill.

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GET THE MAXIMUM

from your lathes by using the

ALORIS "Quick Change" TOOL POST



Only a second to change tools for turning, facing, drilling, boring, reaming, cutting off or any other operation.

- GREAT REPETITIVE ACCURACY.
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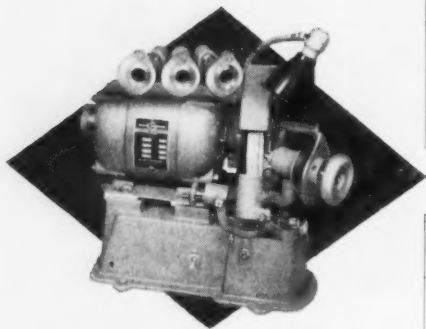
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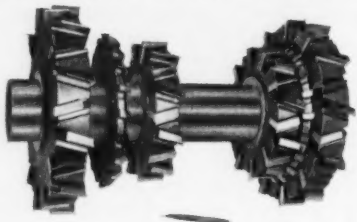
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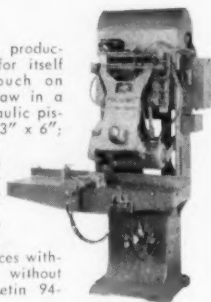
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March, 1955

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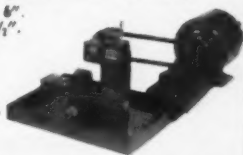
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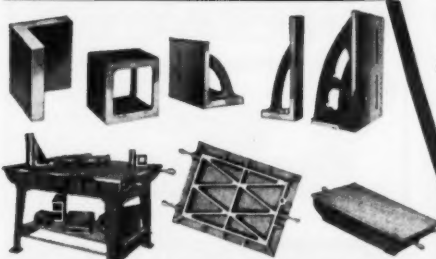
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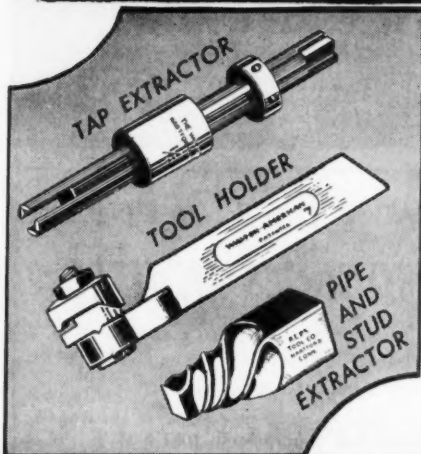
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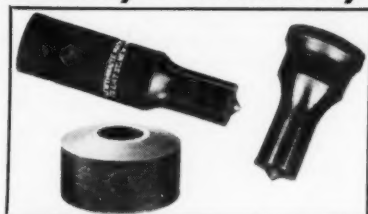
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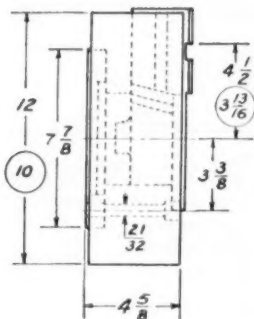
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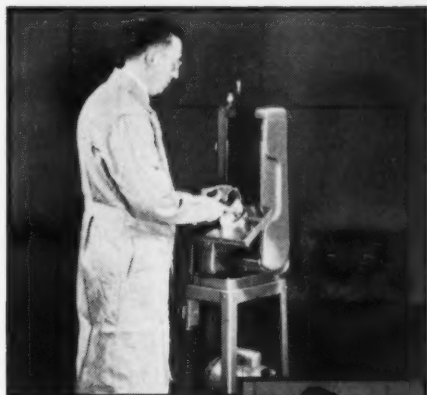
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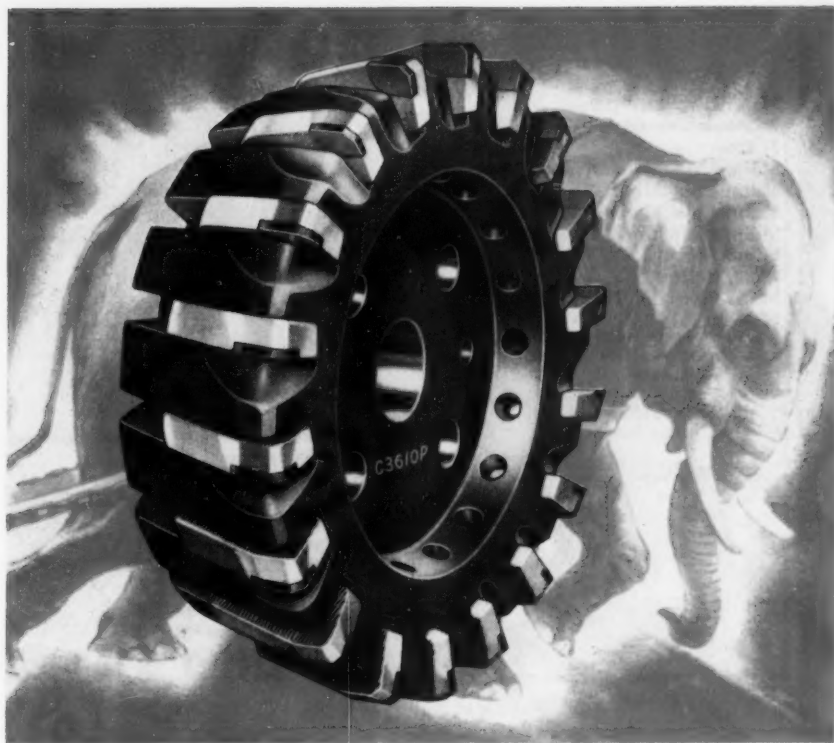
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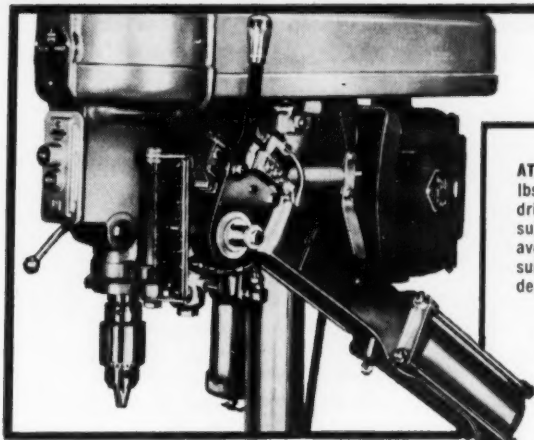
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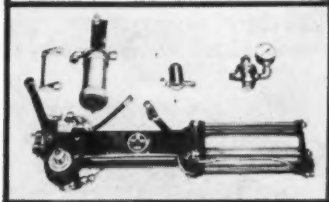
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AT LEFT: $\frac{1}{4}$ " drill operates on 5 lbs. to 7 lbs. air pressure; $\frac{1}{2}$ " drill on 20 lbs. to 25 lbs. air pressure. Feed pressure at drill point averages 14x greater than air pressure, i. e. air pressure at 20 psi delivers 280 psi at drill point.

BELOW: Major components of new W-T Air Feed. No "electronics". No "hydraulics". Installs in about 10 minutes, no machining necessary. Just connect to nearest air supply.



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KEARNEY AND TRECKER CORPORATION
PLAINFIELD, N. J.

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March, 1955

MODERN MACHINE SHOP 343

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IT'S NEW!



MILLERS FALLS PORTABLE SHEAR

Newest MILLERS FALLS cost-cutting tool for industry

This rugged, high-production tool cuts sheet metal — up to 16 gauge (.060") in steel and galvanized sheet — up to 50% greater in aluminum, copper and other non-ferrous metals. Blade adjustments are quickly made — with hex keys conveniently located in tool handle.

In power, in quality, in design, the new No. 16 Portable Electric Shear is an outstanding addition to Millers Falls line of electric tools for production and maintenance. Write for full details on Millers Falls high-performance, advanced-design electric tools. Demonstrations quickly arranged on request.

MILLERS FALLS COMPANY
Dept. MM-5, Greenfield, Mass.



On straight lines or curves, from inside or outside, Millers Falls new No. 16 Portable Electric Shear cuts clean and fast. Weighs only 8 lbs. Minimum radius for left hand cuts is 1/2", for right hand cuts, 1 1/4". High cutting-line visibility. Precision-ground, heat-treated alloy steel blades are quickly removed for resharpening. Built to Millers Falls quality standards, the No. 16 Portable Electric Shear is the latest star in a notable line of industrial electric tools.



The Mark of Superiority

For more data circle 607 on Reader Service Card

the last word

By Fred W. Vogel, Editor

GUARANTEE

Looming like a giant directly in the path of recent outstanding automobile production records and threatening to block the path is the issue of guaranteed wages for the industry. Whether or not the auto industry actually is in a position to guarantee anything, much less jobs, or wages, or production, seems to be entirely beside the point as far as the proponents for guaranteed wages are concerned.

The expected demands for a guaranteed wage are bound to have serious consequences and it is for this reason we think it important to comment now while there is yet time to discuss the issue calmly. It is important also for the reason that so much of our economy is tied either directly or indirectly with the production of automobiles and any disruption in this field may have serious repercussions throughout the country. Also, past experience has shown that in the matter of wage and employment patterns autos frequently set the pace for other industries.

Both sides in the debate about the guaranteed wage seem to have lost sight of the fact that there really is no such thing as a guaranteed wage in a free economy. It may seem like

quibbling to raise this technical point amidst all the proclamations which will put Utopia into effect as soon as the guaranteed wage is prevalent. Utopia is built of words, and facts are helpless against it.

But facts are pretty useful when Utopia collapses. For example, what becomes of the guaranteed wage in a firm which goes bankrupt? It vanishes as quickly as the rainbow.

A company cannot "guarantee" that consumers will buy its products. Therefore, it cannot "guarantee" wages. Management can't escape that distressing fact when it is planning a "guaranteed" wage.

THE ABILITY OF A COMPANY TO ADJUST TO CHANGING MARKET CONDITIONS provides employment stability. Fixed wage commitments limit the flexibility. Thus, a company with a "guaranteed" wage may offer less security to its workers than one without it.

Business executives who have adopted guaranteed wage plans stress that the "guarantee" is a result of natural stability or prior regularization policies and programs.

For this reason, Jay C. Hormel, board chairman of George A. Hormel Company, Austin, Minn., says that he now regrets that his stabiliza-

tion program has become identified with such phrases as "annual wages" and "guaranteed wages".

Here is a statement on the guaranteed annual wage by the Hormel Company which may be useful in explaining the true nature of the "guarantee" to your employees and in your community:

"Certainly our Company is wholly unable to redeem the money consideration in such a guarantee unless we can keep our people actually and profitably employed. The entire asset value of our Company cashing everything we own would only be sufficient to redeem a ten months' guarantee. If we as a Company cannot make such a guarantee, neither can our community, for we know that in our town all of the bank assets including county deposits, city deposits, all the money owned by all of us, would only cover the payroll for nine months. So, when using the phrase 'guaranteed annual wage', we must ask the question — guaranteed by what?

"The only guarantee we know of is the ability of management to manage, coupled with willingness of workers to work. If either fails, then the guarantee fails."

★ ★ ★

POSITIVE APPROACH

The rapidly changing requirements for tool and die making brought on by the fast strides of automation has caused the National Tool & Die Manufacturers Association to focus attention on the need for training more apprentices. At their winter meeting in Los Angeles last month, Harold G. Murdock, secretary of the association stated:

"Toolmakers have been in the forefront in bringing about an industrial revolution whereby instruments linked up with machines replace many human operations. While these labor-saving devices and processes will reduce production man-hours, they will increase the need for skilled technicians and the facilities to create and maintain them. Today, more craftsmen are being promoted, retired, die or leave the trade than are being trained. Therefore, every shop owner and every captive tool room should be training and developing new men."

★ ★ ★

FORTY THOUSAND DIFFERENT WAYS

Just what kind of answer can one make to the frequently-heard charges that automatic machines create mass unemployment by displacing workers? Well, Ben Fairless of United States Steel recently took a careful look at the record and his findings seem to dispel any of the fear anyone might have that jobs will become more scarce. Here are some of his findings:

Despite the widespread installation of the dial telephone, the number of telephone operators increased 79 percent between 1940 and 1950. During the same period, the number of accountants increased 71 percent, notwithstanding the development of automatic business machines and the new electronic brains.

Increased production has opened up six million new jobs in the field of trade in recent years. As a result of technological growth, there are more than 40,000 different ways in which Americans can earn a living.

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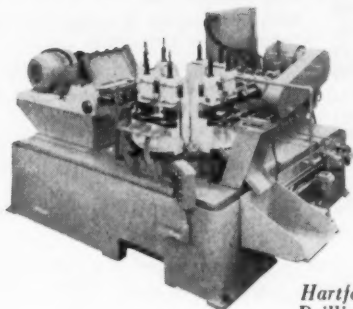
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Precision Pumps for Precision Machinery



*Hartford Special
Drilling Machine
Equipped With a
Ruthman Gusher
Coolant Pump.*

RUTHMAN GUSHER Coolant Pumps



Gusher Coolant Pumps are precision built of the finest materials. The rotating shaft is electronically balanced to cut vibration wear to an absolute minimum. The motor is totally inclosed and drip-proof. The heavy-duty ball-bearings are pre-lubricated. You can specify Gusher Coolant Pumps for your precision machinery with the sure knowledge that they will give you efficient service at low maintenance cost.

THE **RUTHMAN**  **MACHINERY CO.**

1817 READING ROAD

• CINCINNATI 2, OHIO

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The Bigger Difference Brings BIGGER TIME SAVINGS!

DO YOU KNOW...

- the difference between these wheels . . . ?
- how they differ from other abrasives . . . ?
- how they save time—*increase profits* . . . ?



The other is compounded with silicon carbide.
One of these Brightboy Wheels is compounded with aluminum oxide.

EACH of these texture combinations comes in GRAIN SIZES ranging all the way from EXTRA COARSE to EXTRA FINE, IN SOFT, FIRM and TOUGH RUBBER BINDERS.



Brightboy is also made in a full range of accessory products: Rods, sticks and blocks for machine and manual operations.

Thus you have a standard, stock abrasive particularly "matched" to any given job. You burr, clean, finish, polish, in one operation. A Brightboy finish is often the final polish. *Your time savings frequently amount to 50%!*

You eliminate the bother of ordering a "special"—the delivery delay. No before-use preparation or dressing required. You can count on dependable uniformity; prompt delivery.

Rubber and abrasive, working together, give Brightboy scope and adaptability far beyond other methods—give you a new, almost unbelievable concept of finishing.

Ask your dealer NOW for literature on multi-use Brightboy. Advise us if he cannot supply you. Write us on any problem where finishing is involved.



BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO.
95 North 13th Street • Newark 7, N. J.
World's Pioneer Manufacturers of Rubber-Bonded Abrasives

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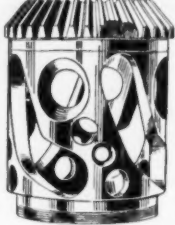


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When you need cams, come to Rowbottom for prompt service at worthwhile savings.

THE ROWBOTTOM MACHINE CO.
WATERBURY, CONNECTICUT

Also Cam Milling and Cam Grinding Machines.
Ask for literature.

Send your specifications for quotations.

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ANGLE VISES
6 JAW
SIZES

1 1/2"
2 1/2"
3"
4"
6"
8"

Jaws with
SWIVEL BASES



PALMGREN

for **MILLING MACHINES,**
DRILL PRESSES,
GRINDERS, SHAPERS...

Built sturdy and rugged for tough heavy jobs. Accurately machined.

IMMEDIATE DELIVERY

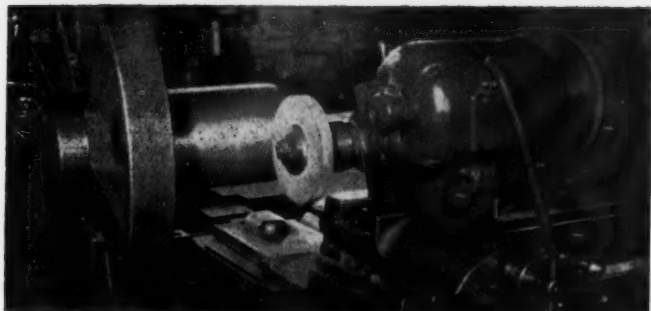
Complete line of Machine Tool Accessories. Write for catalog 202B.

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No. 40B and 60B
4" and 6" Jaws
with SWIVEL BASES



CHICAGO TOOL AND ENGINEERING CO., 8383 South Chicago Avenue, Chicago 17, Illinois

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EXTERNAL

(Wheel Guard removed for clarity)

INTERNAL ►



Your Lathe Will Do Precision Grinding!



We also manufacture Bench and Pedestal Grinders and Buffers, Drill Grinders and Disc Grinders.

Ordinary lathes are easily converted with HISEY Precision Grinders.

Pulley selection gives correct speed for any size or type grinding wheel. External or internal grinding available—for internal wheels as small as $\frac{5}{8}$ " diameter—external up to 24". Regardless of load, constant speed motor insures uniform, efficient grinding.

Illustrated at left is the grinder with external spindle mounted, and two of the many internal spindles available. Grinder can also be mounted on shapers, boring mills, and planers for surface grinding operations.

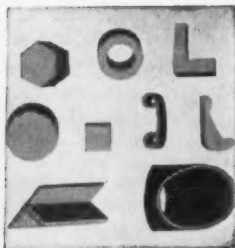
Write today for catalog 72 MR

Hisey THE HISEY-WOLF MACHINE CO.
CINCINNATI 8, OHIO
Division of The Cincinnati Electrical Tool Co.

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THE CINCINNATI
Wet Abrasive
Cut-Off Machine



Cut Down
ON
CUT-OFF TIME!

Cut any metal, solids or tubing fast and accurately! Capacity up to 2¼" in solids, 3½" in tubing. Straight or angle cuts up to 45°. And look at these speeds: 2" bar stock in 15 seconds . . . 2" tubing, 3/32" wall, in 10 seconds . . . 2" angle iron, ⅛" thick, 45° angle, in eight seconds. Special features include Cincinnati's exclusive water nozzle, insuring proper coolant flow for longer wheel life; and foot-operated vise, freeing operator's hands for faster production.

Write today for Bulletin 55-FA.

MFRS. OF DRILLS, GRINDERS, BUFFERS AND PORTABLE TOOLS

TRADE

The Cincinnati

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THE CINCINNATI ELECTRICAL TOOL CO.

Division of THE R. K. LeBLOND MACHINE TOOL CO.

CINCINNATI 8, OHIO, U. S. A.

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March 1955 Issue

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Company Name

Company Address

Your Title

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machine
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City

Zone

State

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2	22	42	62	82	102	122	142
3	23	43	63	83	103	123	143
4	24	44	64	84	104	124	144
5	25	45	65	85	105	125	145
6	26	46	66	86	106	126	146
7	27	47	67	87	107	127	147
8	28	48	68	88	108	128	148
9	29	49	69	89	109	129	149
10	30	50	70	90	110	130	150
11	31	51	71	91	111	131	151
12	32	52	72	92	112	132	152
13	33	53	73	93	113	133	153
14	34	54	74	94	114	134	154
15	35	55	75	95	115	135	155
16	36	56	76	96	116	136	156
17	37	57	77	97	117	137	157
18	38	58	78	98	118	138	158
19	39	59	79	99	119	139	159
20	40	60	80	100	120	140	160

ADVERTISEMENTS

	First Cover	Second Cover	Third Cover	Fourth Cover
201	220	239	258	277
202	221	240	259	278
203	222	241	260	279
204	223	242	261	280
205	224	243	262	281
206	225	244	263	282
207	226	245	264	283
208	227	246	265	284
209	228	247	266	285
210	229	248	267	286
211	230	249	268	287
212	231	250	269	288
213	232	251	270	289
214	233	252	271	290
215	234	253	272	291
216	235	254	273	292
217	236	255	274	293
218	237	256	275	294
219	238	257	276	295
220	239	258	277	296
221	240	259	278	297
222	241	260	279	298
223	242	261	280	299
224	243	262	281	300
225	244	263	282	301
226	245	264	283	302
227	246	265	284	303
228	247	266	285	304
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231	250	269	288	307
232	251	270	289	308
233	252	271	290	309
234	253	272	291	310
235	254	273	292	311
236	255	274	293	312
237	256	275	294	313
238	257	276	295	314
239	258	277	296	315
240	259	278	297	316
241	260	279	298	317
242	261	280	299	318
243	262	281	300	319
244	263	282	301	320
245	264	283	302	321
246	265	284	303	322
247	266	285	304	323
248	267	286	305	324
249	268	287	306	325
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251	270	289	308	327
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255	274	293	312	331
256	275	294	313	332
257	276	295	314	333
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259	278	297	316	335
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292	311	330	349	368
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326	345	364	383	402
327	346	365	384	403
328	347	366	385	404
329	348	367	386	405
330	349	368	387	406
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332	351	370	389	408
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334	353	372	391	410
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348	367	386	405	424
349	368	387	406	425
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415	434	453	472	491
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423	442	461	480	499
424	443	462	481	500
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426	445	464	483	502
427	446	465	484	503
428	447	466	485	504
429	448	467	486	505
430	449	468	487	506
431	450	469	488	507
432	451	470	489	508
433	452	471	490	509
434	453	472	491	510
435	454	473	492	511
436	455	474	493	512
437	456	475	494	513
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451	470	489	508	527
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453	472	491	510	529
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466	485	504	523	542
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469	488	507	526	545
470	489	508	527	546
471	490	509	528	547
472	491	510	529	548
473	492	511	530	549
474	493	512	531	550
475	494	513	532	551
476	495	514	533	552
477	496	515	534	553
478	497	516	535	554
479	498	517	536	555
480	499	518	537	556
481	500	519		

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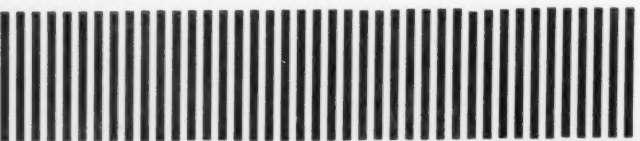
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This leadscrew "leads" a double life!

*Two views of the
Lodge & Shipley
Hollow Spindle
leadscrew show
reversibility feature*



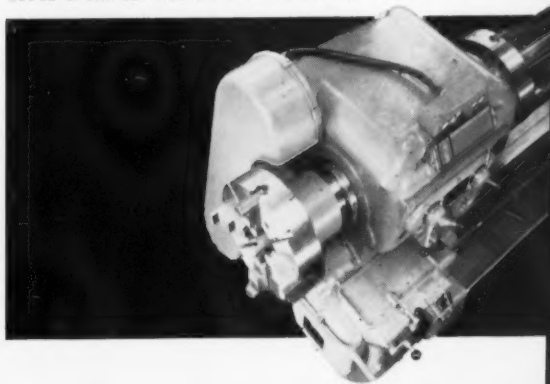
No need to replace the leadscrew of your Lodge & Shipley Oil Country Lathe if it eventually becomes worn on the head end. Simply reverse the leadscrew, end for end, for renewed accuracy.

On an Oil Country Lathe, most of the work is done close to the spindle nose. As a result, the greatest wear occurs at the headstock end. Lodge & Shipley's unique reversible feature provides real savings by doubling leadscrew life.

It's one of the many reasons why the versatile Lodge & Shipley Oil Country or Hollow Spindle Lathe is in demand far beyond the oil fields. Equally efficient for very long pieces chucked through the large hole in the spindle, or for normal between-centers work, it saves capital investment and floor space. And, the two-speed tailstock makes drilling large holes easier.

Write for detailed literature: The Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio.

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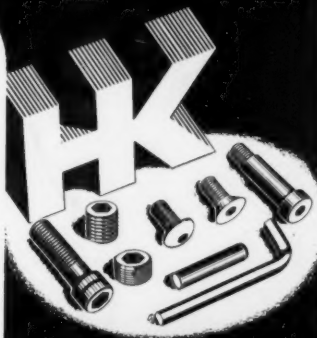


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